Humboldt-Universität zu Berlin

Faculty of Life Sciences

Albrecht Daniel Thaer-Institute of Agricultural and Horticultural Sciences

Control is Good, Trust is Better – Social Capital and Implications at Lake Shkodra, Albania

M.Sc. Thesis in the Study Programme Integrated Natural Resource Management

submitted by Antonia Schraml

Berlin | July 13, 2016

1st supervisor Prof. Dr. Robert Arlinghaus
Leibniz-Institute of Freshwater Ecology and Inland Fisheries |
Humboldt-Universität zu Berlin

2nd supervisor Dr. Carsten Mann
Technische Universität Berlin, Center for Technology and Society |
Humboldt-Universität zu Berlin

Abstract

Complex social-ecological systems are characterized by a diversity of interactions and feedbacks among the elements of the ecological and the social dimension. Inland fisheries represent such complex systems, where the reconciliation of interests between local resource use and protection is a key aspect of sustainability. In order to account for the uncertainties and non-linear feedbacks that challenge the governance of social-ecological systems, flexible and adaptive co-management systems provide a valuable approach. In these management regimes, the devolution of responsibilities and the participation of local resource users is of pivotal role for achieving social, economic and ecological sustainability targets. The alignment of the social and the ecological dimension is associated with some degree of collective management or cooperation among individuals. The configuration of social networks, relations of trust and the rules-in-use – attributes which are included in the concept of social capital – shape the social dimension in that they influence the actors' ability to cooperate, provide incentives and motivations for compliance or non-compliance with regulations and facilitate knowledge exchange. At Lake Shkodra, a biodiversity hotspot in Albania, information about the social dimension of the fishery co-management are scarce and particularly lack an understanding of implications arising through the post-socialist context of the country. This knowledge gap was addressed with a qualitative case study approach. 36 semi-structured interviews with actors at the local, regional and national level across actor groups, e.g. fishermen, state authorities and environmental organizations, were conducted during fieldwork in August and September 2015. The use of the Social-ecological Systems framework facilitated the structured analysis of three micro-level outcomes of fishery: levels of compliance, the likelihood of self-organization and social fit. With the exception of the fishing community in Zogaj, limited networks of trust among actors and weak bonding, bridging and linking ties were identified. Effective co-management is further influenced by corruption, levels of participation and the perceived legitimacy and the experiences of actors from communist times. The study highlighted the tight linkages and feedbacks among the elements of social capital and the outcomes associated with the social dimension of fishery. Investing in the establishment of trustful relations through communication and stakeholder participation could leverage adaptive capacities of the co-management and pave the way for long-term sustainability.

Përmbledhje

Sistemet komplekse si peshkimi janë të karakterizuara nga një shumëllojshmëri e ndërveprimeve sociale dhe ekologjike. Por këtu qëndrojnë në kundërshtim interesat e përdoruesve të burimeve me interesat e atyre qe duan t'i mbrojnë këto burime. Per t'i kombinuar këto të fundit është i nevojshëm një manaxhim fleksibël dhe i pershtatshëm. Ne rastin e peshkimit në liqene dhe lumenj teoria e ndërveprimit kolektiv dhe hulumtimi mbi aftesinë ripërteritëse të ekosistemeve e ka fokusin në sisteme manaxhimi të decentralizuara, të cilat parashikojnë ndarjen e përgjegjësive ndërmjet nivelit kombëtar, rajonal dhe atij lokal. Përfshirja e aktorëve te ndryshëm si dhe bashkëpunimi mes tyre mund të sigurojë një manaxhim të përshtatshem për resurset natyrore. Kushtet ndër të cilat mundësohet ne bashkëpunim i suksesshëm janë të lidhura ngushtë me aspektet ekologjike dhe dimensionin social dhe përmbajne rrjete sociale, besim ndërmjet aktoreve po ashtu rregulla dhe norma, të cilat ndikojnë në sjelljen e aktorëve. Të gjitha këto karakteristika i përfshin konzepti ‚Kapitali social'. Në liqenin e Shkodrës, në një pikë të nxehtë biodiversiteti të një rëndësie ndërkombëtare, organizata e peshkimit merr përsipër manaxhimin e peshkimit dhe konservimin e tij. Megjithatë roli i rrjeteve, besimi, instutucionet ekzistuese dhe efektet e tyre në manaxhimin e liqenit te Shkodrës deri tani janë pak të njohura. Studimi i mëposhtem ka për qellim të zvogelojë hendekun e dijeve si dhe të hedhë dritë mbi ndikimin e sfondit post-socialist mbi kapitalin social ne lidhje me peshkimin në liqen. Për këtë qëllim përdoret koncepti "social-ecological systems framework" me ndihmën e së cilit në liqenin e Shkodrës analizohen efektet nga kapitali social. Ky framework (kornize) mundëson ndërveprime të cilat cojnë në reagime midis të ndryshueshmes dhe efekteve. Baza e të dhënave, të cilat u siguruan në gusht dhe shtator te 2015-es ishin 36 intervista te mirëstrukturuara me aktore të nivelit lokal, rajonal dhe kombëtar. Përmes përdorimit të framework identifikohen edhe tre ndikimet sociale: zbatimi i rregullave, veteorganizimi dhe përshtatja sociale. Me përjashtim të fshatit të peshkimit Zogaj këto janë ndikuar nga besimi i kufizuar ndermjet aktorëve dhe pjesërisht nga lidhjet e paqëndrueshme midis tyre në nivele te ndryshme. Ndërkohë që peshkatarët bien dakort për rregulloret në pergjithësi, ndikojnë korrupsioni, mungesa e llogaridhënies dhe legjitimiteti negativisht në efektshmerinë e manaxhimit. Përvojat nga periudha e komunizmit ndikojnë akoma në përceptimin e përdoruesve të resurseve. Studimi njerr në pah rëndesinë e dimensionit social në manaxhimin e liqenit të Shkodrës dhe tregon se komunikimi i përmirësuar dhe pjesëmarrja e aktorëve mund të jenë një pikënisje për të ndërtuar besimin nevojshëm për nëj bashkëpunim të efektshëm.

Acknowledgements

"If we let one another down, if we don't give up our personal desires to the common good, nothing, nothing on this barren world can save us. Human solidarity is our only resource."

U. K. Le Guin in the novel "The Dispossessed" (1974, p. 167)

I would like to thank Prof. Dr. Robert Arlinghaus and Dr. Carsten Mann first for their interest in supervising the study and second for their great support and valuable feedback throughout the process. Furthermore, I would like to thank Tomasz Pezold from IUCN, without whom the study in Albania would not have been possible. I am deeply thankful for the support he provided from the beginning and especially thank him for the chance to participate in project meetings in Shkodra.

Special thanks also to the many people who provided priceless support and various contributions to the thesis: the interview partners in Albania, the supportive fishermen and their families, my interpreters Paola Dashi and Paola Marashi, Daniela Godo and the INCA Albania team, Marie Fujitani and Sophia Kochalski. I am grateful for the financial support provided by the DAAD Promos scholarship.

During my studies I learned to see the "overall" picture, which sometimes brought me close to despair regarding all the things that sometimes seem so utterly wrong in this world. Discussing those issues, trying to find solutions and taking small steps to contribute to shaping a better place I think is of great importance. I would like to thank everyone who strengthened my ability for this way of thinking in endless discussions, exchanged thoughts and great moments of inspiration.

Contents

List of Figures

List of Tables

List of Abbreviations

AKZM	Agjencia Kombëtare e Zonave të Mbrojtura
approx.	approximately
EU	European Union
FAO	Food and Agriculture Organization
FMO	Fishery Management Organization
GDP	Gross Domestic Product
GEF	Global Environment Facility
IAD	Institutional Analysis and Development Framework
ITQ	Individual Transferable Quota
IUCN	International Union for Conservation of Nature
MARDWA	Ministry of Agriculture, Rural Development and Water Administration Albania
MoE	Ministry of Environment Albania
MPA	Marine Protected Area
NAPA	National Agency for Protected Areas
NGO	Non-Governmental Organization
PA	Protected Area
REA	Regional Environmental Agency
SES	Social-Ecological System
TAC	Total Allowable Catch
UNECE	United Nations Economic Comission for Europe
UNEP	United Nations Environment Programme

1 Introduction

1.1 Fishery and the Environment

The human world is deeply embedded in the natural world and relies on the processes, goods and services that nature provides for all parts of every-day life (MILLENIUM ECOSYSTEM ASSESSMENT, 2005). The complexity of this relation consists of the processes and feedbacks among the social and the ecological system that exhibit non-linear feedbacks, surprises and uncertainty (LIU *et al.*, 2007; ANDERIES, 2014). Acknowledging and understanding the tight relations and dynamics between the human and the environmental system by a social-ecological systems perspective is crucial in order to overcome some of the major difficulties society faces today (FISCHER *et al.*, 2015), ranging from impacts of climate change to agricultural production and food security as well as the conservation of biodiversity at the local and global scale (ADGER, 2010; MCCLANAHAN *et al.*, 2009; CINNER *et al.*, 2009b; CHEUNG *et al.*, 2013).

Among the diversity of human-environment interactions, fisheries take an essential part: worldwide, marine and inland fisheries represent an important industrial sector, involving in the primary sector about 58 million people in capture fisheries and aquaculture in 2012 and yielding a total catch of 93.7 million tonnes in capture fisheries alone (FAO, 2014). Inland fisheries, which to a large part consist of small-scale fisheries (WELCOMME *et al.*, 2010), contribute substantially to local and regional food security and income generation for millions of people worldwide (COOKE *et al.*, 2016; LYNCH *et al.*, 2016) and deliver multiple non-use values, e.g. cultural values and recreation (HUNT *et al.*, 2013; ARLINGHAUS *et al.*, 2002). However, increasing pressure on aquatic resources (e.g. through population growth), uncertainty regarding the state of fish stocks (e.g. through under- or unreported catches from subsistence or illegal fisheries), and declining catch rates are attributed to both inland and marine fisheries (FAO, 2014; PAULY AND ZELLER, 2016; COSTELLO *et al.*, 2012; WELCOMME *et al.*, 2010). Against this background, implications of fisheries are found for the social as well as the ecological system. For example, the race for fish impacts the socioeconomic situation of local resource users (CINTI *et al.*, 2010), whereas at the ecological scale fishing activities might lead to alterations in the species composition and the structure of the food web, or overcapitalization might cause the collapse of targeted fish stocks (PAULY *et al.*, 2002; BERKES ET AL., 2006). Challenges arising through interactions of the social and the ecological system are even more complex in freshwater ecosystems, where a variety of human-induced interactions besides fishing activities influence the system, e.g. diffuse pollution from agricultural fields, water extraction or constructions for flood protection (WELCOMME *et al.*, 2010; COOKE *et al.*, 2016).

1.2 Global and Local Challenges

Given the importance of the world's fisheries for millions of people, managing fisheries is key to prevent overexploitation and ensure sustainability for both the ecological and the social system (COSTELLO *et al.*, 2016; COOKE *et al.*, 2016). Sustainability as guiding target for human interaction within the ecological system aims at ensuring the functioning of ecosystems within system boundaries and its carrying capacity (BARKIN, 1998; LEHTONEN, 2004; DALY, 2014). However, the design of natural resource management systems is based on the normatively defined objectives for the particular system (HILBORN, 2007b; HUNT *et al.*, 2013). From an environmental point of view, strict protection zones prohibiting human intervention might be a preferred option for the conservation of endangered species, whereas management systems that, for example, include individual transferable quotas might foster economic profitability and principally serve social objectives (WELCOMME, 2016; ACHESON *et al.*, 2015). In order to meet the sustainability target, reconciling objectives for the social and the ecological system is necessary yet challenged by the complex nature of social-ecological systems, e.g. uncertainty about thresholds (WELCOMME, 2016; LIU *et al.*, 2007). Different stakeholders might value objectives differently and striving for socially desirable outcomes might be at the expense of the ecologically desirable state, or vice versa (HILBORN, 2007a). Natural resource management approaches that account for the complexity of feedbacks and processes in social-ecological systems make use of the potentials that adaptive and context-specific governance arrangements offer (FOLKE *et al.*, 2005; OLSSON *et al.*, 2004). Adaptive management refers to learning in flexible systems that enables the dynamic revision of the institutional setting according the ecological knowledge (FOLKE *et al.*, 2005). Drawing on findings from resilience (the ability of a system to contain its function after changes or disturbances; HOLLING, 1973) and collective action theory and the concepts of adaptive systems, a key element of these management approaches is the participation of and/or the partial allocation of governance responsibilities to local actors, e.g. resource users and communities (HOLLING, 1973; FOLKE *et al.*, 2005; ARMITAGE *et al.*, 2009).

Among those approaches, collaborative management, also referred to as co-management, describes the "sharing of power and responsibility" (BERKES, 2004a, p. 626) between multiple stakeholders from the local to the national level (CARLSSON AND BERKES, 2005). The cooperation that is necessary in order to implement successful co-management systems depends on the actors involved and the formal and informal institutions (the rules-in-use) underlying and guiding their respective behavior, as e.g. PINKERTON AND WEINSTEIN (1995), POMEROY *et al.* (2001) and HILBORN (2007b) showed in the context of fisheries co-management in different case studies. Besides there relevance for fisheries, freshwater as well as marine ecosystems provide important habitats for a great diversity of species, of which many are considered rare, endangered or threatened (SAUNDERS *et al.*, 2002; KELLEHER,

1999). Despite the integration of local users in the management process, objectives of resource use often contrast with the objectives of nature conservation (REDPATH *et al.*, 2013).

Lake Shkodra, Albania One example of a freshwater ecosystem where resource use as well as habitat and biodiversity protection are of focal interest, is Lake Shkodra in Albania. Located in South East Europe, the transboundary lake between Albania and Montenegro (see Figure 3.1 on page 48) is – with a surface area of up to 500 km^2 – the largest lake of the Balkan Peninsula (VUGDELIC, 2010b). Due to its biophysical and geomorphological characteristics, the lake comprises a great variety of habitats ranging from partially flooded marshlands to limnetic habitats (RAMSAR SITES INFORMATION SERIES, 2006; PEVELING *et al.*, 2015). According to VUGDELIC (2010b), about 2 500 species of plants, vertebrates, invertebrates and lower plants are identified, of which many are rare or endangered (e.g. Starry sturgeon, *Acipenser stellatus*) or endemic, e.g. the Skadar rudd, *Scardinius knezevici* (RAMSAR SITES INFORMATION SERIES, 2006; VUGDELIC, 2010b; RAZNATOVIC AND DHORA, 2001). It is therefore a biodiversity hotspot of international importance. The Montenegrin part of the lake was declared as National Park in 1983 and designated as Ramsar site in 1995. The Albanian part is protected as Managed Nature Reserve and Ramsar site since 2005 and 2006, respectively.
Besides the relevance for genetic and habitat diversity, the lake area is also home to about 230 000 people at the Albanian part, who live in communities close to the shore or in the city of Shkodra. About 200 families rely directly or indirectly on small-scale fishery as source of income (SANDLUND, 2004; ROYAL HASKONING, 2006). Alternative income opportunities are restrained, e.g. by the steep and rocky terrain at the western shore, imposing high pressure on the lake's natural resources. Of about ten commercially exploited fish species, bleak (*Alburnus albidus alborella*) and Common carp (*Cyprinus carpio*) yield the highest economic value (SANDLUND, 2004).
After over forty years of communism, the recent development of Albania is shaped by the transition towards a market-based economy and democracy (EC, 2012; PAPATHIMIU, 2012) as well as the accession to the EU. In this context, a decentralized fishery management was introduced via the establishment of a Fishery Management Organization as co-management structure in 2002 (WORLD BANK, 2008). The Fishery Management Organization is concerned with the "conservation of [the] ecological balance and rational exploitation of fish resources" (Agreement No. 1363, February 26, 2014) at Lake Shkodra. However, difficulties regarding the enforcement of formal laws and regulations, and weak structures of the Fishery Management Organization persisted, as reports pointed out (BEKTESHI *et al.*, 2013; DEDEJ *et al.*, 2010; EC, 2012; KATNIC, 2013).

A vast body of literature provided evidence that the success or failure of co-management

arrangements substantially depends on factors of the social dimension that affect the actors' behavior and ultimately enable or hinder cooperation (e.g. BASURTO *et al.*, 2013a; OSTROM, 2007b; VILLASANTE AND ÖSTERBLOM, 2015). Particularly for complex social-ecological systems such as inland fisheries, collective action research contributed to the understanding that the abilities of groups to organize, thus cooperate, are influenced by the configuration of the relations between actors, the levels of trust and the present formal and informal rules (GRAFTON, 2005; BRONDIZIO *et al.*, 2009; PRETTY, 2003; ACHESON, 1975). The interplay of trust, trustworthiness, networks and institutions at the individual and group-level is captured in the concept of social capital (PUTNAM, 1995; AHN AND OSTROM, 2002; FUKUYAMA, 1999). The configuration of a community's or group's social capital is found to substantially affect the success of collaboration in fisheries, e.g. in that it relates to the actors incentives for compliance, thus determining behavior, the level of shared norms and values among actors and the ability to exchange information and knowledge for social learning (ARMITAGE *et al.*, 2009; BODIN AND CRONA, 2008; HATCHER *et al.*, 2000). However, trust, networks and institutions are also influenced by the wider socioeconomic and historical context of the actors (PLUMMER AND FITZGIBBON, 2006), as e.g. DAEDLOW *et al.* (2013) showed for recreational fisheries in Germany. In Albania and other eastern and southeastern European countries, implications for social capital are particularly interesting given the transition from communist or socialist regimes to market democracy (ROSE-ACKERMAN, 2001; USLANER AND BADESCU, 2004; ROTHSTEIN, 2000).

1.3 Research Approach and Research Questions

Throughout the scientific literature the importance of acknowledging the social dimension for the effective co-management of fisheries is emphasized (LEHTONEN, 2004; HUNT *et al.*, 2013; CINTI *et al.*, 2010). However, for the case of fishery at Lake Shkodra studies about the social fabric with regard to trust and networks as well as formal and informal institutions are lacking. The introduction of a co-management regime tightly linked the overall sustainability outcome at the lake to the social dimension, in that the management aims at organizing local fishermen while at the same time the objectives of nature conservation are pursued. Therefore, the configuration of social relationships, trust and the role of the formal and informal institutions becomes important for understanding actors' cognitions and behavior that might enable or hamper cooperation, and to identify linkages and feedbacks between the social and the ecological dimension of fishery at Lake Shkodra. Against this background, the study focused on the analysis of the social structure at the lake regarding the relations of trust, networks and institutions – factors which are captured in the concept of social capital. Regarding the implications of the post-socialist context for natural resource management (e.g. in SCHMIDT AND THEESFELD, 2012; KLUVÁNKOVÁ-ORAVSKÁ *et al.*, 2009), the study particularly aimed

at revealing how past experiences and the historical background relate to the social dimension of fisheries at the lake. To account for the complex interactions between and within the social and the ecological system, the social-ecological systems framework provides a useful tool to guide the analysis (OSTROM, 2007a, 2009; MCGINNIS AND OSTROM, 2014). The application of the framework facilitated a diagnostic procedure that enabled the identification of variables, their interactions and relations (SCHLÜTER *et al.*, 2014; HINKEL *et al.*, 2015) with regard to the elements of social capital.

Research Questions The above named research focus was addressed with the following overall research questions:

1. What are the social outcomes of fishing activities at the social-ecological system Lake Shkodra?

2. What is the role of social capital in the formation of these outcomes?

More specifically, the underlying subquestions facilitated the assessment of the overall research questions:

(a) What is the current social-ecological situation at Lake Shkodra with regard to fishing activities?

(b) Which particular variables and interactions are involved in shaping the identified social outcomes?

(c) What are the roles of institutions, networks and levels of trust?

(d) What feedbacks can be identified among the outcomes and interacting variables?

(e) How does the communist background and post-socialist context affect the social dimension of fishing activities at Lake Shkodra?

For the purpose of answering the above named research questions the study used a qualitative approach to analyze the configuration of social capital and resulting implications for fishing activities at Lake Shkodra. Information were gathered via the review of literature and documents as well as 36 semi-structured interviews with actors concerned with fishery at Lake Shkodra, e.g. local fishermen, national and international non-governmental organizations and state authorities. The empirical data were analyzed with a qualitative content analysis (MAYRING, 2000). Following the diagnostic procedure of HINKEL *et al.* (2015), the social-ecological systems framework was adapted to the fishery context of Lake Shkodra in the light of social capital, and to account for the variables related to the post-socialist background.

Structure The study proceeds as follows: in the following Chapter 2, the theoretical background of the study is provided through a comprehensive literature review on the theoretical understanding of collective action, the concept of social capital and the social-ecological systems framework. Following the presentation of the study's methodological approach in Chapter 3, the contextually adapted SES framework is introduced as basis for the following results of the analysis of the empirical data. Chapter 4 then begins with an outline of the social-ecological system Lake Shkodra. The analysis of the empirical data is presented in Chapter 5. The proceeding discussion in Chapter 6 refers to the concept of social capital in the fisheries context at Lake Shkodra and reflects on some methodological limitations. The conclusion and outlook in Chapter 7 finally draw up the results and end with highlighting the relevance of the study for Lake Shkodra.

2 The Social Element of Social-Ecological Systems

2.1 Collective Action and Fisheries Management

The complexity of social-ecological systems (SES) imposes great challenges on their management. Particularly the characteristics of aquatic ecosystems and their exploitable resources are subject of diverse interests, e.g. their use or conservation. The mainly mobile character of the resources further aggravates the governance, because knowledge about the size of the resources stock might be scarce and controlling access to the resources system and its resources difficult. The theoretical background to these governance challenges is outlined in the following chapters.

2.1.1 Characteristics of Common-Pool Resources

The attributes generally associated with the differentiation of goods are *subtractability* and *excludability* (OSTROM, 2005). Subtractability[1] refers to the consumption of goods: often, once consumed, the good is subtracted from the stock and not available any more to others, e.g. a fish caught by a commercial fisher cannot be caught any more by a recreational angler. Excludability describes the possibility of controlling access of users and other stakeholders to resources (HINKEL *et al.*, 2015). As for subtractability, the level of excludability can range from high to low, e.g. depending on the costs associated with exclusion (HAGEDORN, 2002). Following a basic binary differentiation in high and low subtractability and excludability, four basic types of goods can be distinguished: toll goods, private goods, public goods and common-pool resources (OSTROM, 2005; VATN, 2001). The characteristics of these goods in terms of excludability and subtractability (as shown in Table 2.1) have implications for the primary type of use they allow. Private goods, like a car, are generally easy to control access to and highly subtractable, and therefore likely to be managed effectively through market mechanisms[2], whereas those markets fail in the provision of public goods (e.g. a recreation area in urban space) or common-pool resources (e.g. marine resources) at an optimal level, because actors face a lack of incentives to contribute to their supply (HINKEL *et al.*, 2015). These incentives are connected to the distribution of costs and benefits generated through the production or consumption of the goods. While high subtractability and excludability of private goods such as ice cream ensure the benefit to only one user, public goods like fresh air and common-pool resources, e.g. fish, face externalities. These apply to the provision (supply) of common-pool resources as well as to their appropriation, like the consumption of the provided good (cf. GARDNER *et al.*, 1990). Assuming rational actors and the absence of property rights (which

[1] Compare to the terminology of VATN (2001, p. 670), who uses the more intuitive term “rivalry in use or consumption”.

[2] This is only true when transaction costs are zero and actors have perfect information. See VATN (2001) for detailed considerations.

Table 2.1 – Basic differentiation of goods, following OSTROM (2005, p. 24) and VATN (2001).

		Subtractability	
		High	Low
Excludability	Low	Common-pool Resources	Public Goods
	High	Private Goods	Toll/Club Goods

equals an open-access situation where no regulations of access are defined), resources are subject to overexploitation, since every actor seeks to maximize benefits from the resource before other actors use the resource (VATN, 2001). Hence, resource users become free-riders, as they are not contributing to the provision of the good, e.g. replanting trees in a forest, so that these resources are generally over-exploited or "under-produced" (ANTHONY AND CAMPBELL, 2011, p. 285). From an resource economists point of view, unrestrained resource exploitation would inevitably result in the "tragedy of the commons" that HARDIN (1968) illustrated for grazing on an open pasture. To avoid the predicted degradation of common-pool resources under open-access conditions, HARDIN proposed two solutions: the enforcement of rules through state authorities or the transformation of the common-pool resource in private property (HARDIN, 1968; PRETTY AND SMITH, 2004; VAN LAERHOVEN AND BARNES, 2014).[3] Though compelling, this view was contested through evidence from a great variety of field studies that were able to show that resource users were able to establish rules to collectively manage common property for hundreds of years in a sustainable way (OSTROM, 1990; SCHLAGER AND OSTROM, 1992). Given the examples where neither state nor private property but common property regimes were found to successfully overcome the common-pool resource dilemma of exclusion and free-riding, emphasis was placed on research about "the conditions under which individuals could co-operate to govern the commons" (JOHNSON, 2004, p. 411).

2.1.2 Tragedies and Collective Action Theories

Against this background, the development of common-pool research shifted to a new direction, where also HARDIN's already contested "tragedy" of commons under open access was discussed. VATN (2001) showed that the characteristics of resources as described above as well as attributes of the actors influence the choice of a governance regime, which may be in the extremes common property or state property. ACHESON (1975) described the emergence of collective-choice rules among the lobstermen of Maine in order to control access to

[3] Property rights can be distinguished in access rights, withdrawal rights, management rights, exclusion rights, and alienation rights (MCGINNIS, 2011, p. 178). The specific combination of property rights reveals the property rights systems (or regime, cf. COX AND FREY, 2011), which can be open access, private property, public property, co-management regimes or common property (COX AND FREY, 2011, p. 18).

the common-pool resources alongside the *de jure* defined property-rights regime authorized through the state. Among these institutions, some proved to be more stable while others failed to persist in times of change, e.g. the introduction of new harvesting technology. Therefore, SCHLAGER AND OSTROM (1992) highlighted the importance of examining the full range of possible property rights regimes and according institutions that might apply for governing common resources.

The work of OLSON (1971) on the conditions under which "groups of people with common interests will organize to pursue collectively those interests" (WARNER AND HAVENS, 1967, p. 446) established the base for the development of collective action theories with assuming self-interested "rational egoists" (OSTROM, 2012, p. 235) as actors in economic experiments. Though the theory was initially developed from an economic perspective, it spread widely across disciplinary boundaries from politics and sociology. According to the definition of groups as "a number of individuals with a common interest" (OLSON, 1971, p. 8), OLSON distinguishes three types: "privileged" groups, "intermediate" small groups, and large "latent" groups, which differ in their ability to reach common interests. Game theory and respective economic games like the prisoner's dilemma that assume purely rational and selfish agents support OLSON's thesis of the conditions for non-cooperating actors, if coercion or another form of control and enforcement is absent. Besides coercive measures to ensure the provision of public (common) goods, the decision about whether to cooperate is influenced through the actor's incentives. Incentives other than pure self-interest are able to create space for collective action (WARNER AND HAVENS, 1967; HARKES, 2006). Emanating from this, a second generation of collective action theories emerged considering implications from case studies which revealed attributes of individuals that impact the likeliness of collective action (AHN AND OSTROM, 2002). Adjustments to the first generation of collective action theories include the revision of rational and self-interested actors towards a "non-reductionist view that takes heterogeneous individual values [...] seriously" (AHN AND OSTROM, 2002, p. 7), where actors act in the pursuit of their individual goals as well as of those of the community to which they belong (MCGINNIS AND OSTROM, 2014). Given the complexity of this "boundedly rational" actor (OSTROM, 2005) – who is embedded in a wider social context, influenced and shaped through social relationships, the community, and past experience – OSTROM (1990) further identified eight characteristics of the institutional[4] setting important for successful collective action, commonly known as (institutional) design principles. These principles are derived from a great set of case studies and were found to have significant influence on the state of resource management regimes tailored to the governance of common-pool resources

[4] Acknowledging the wide range of definitions and uses for the term "institution", throughout this study the understanding of institutions as formal and informal rules will be followed as reflected in the definition of OSTROM (1986, p.5), where rules "refer to prescriptions commonly known and used by a set of participants to order repetitive, interdependent relationships. Prescriptions refer to which actions (or states of the world) are *required*, *prohibited*, or *permitted*" [emphasis in original].

(cf. COX *et al.*, 2010; OSTROM AND COX, 2010). Following the definitions in OSTROM (1990, 2005) and COX *et al.* (2010), the design principles can be described as follows:

1. *Clearly defined boundaries*: The boundaries of the common-pool resource must be well defined.

2. *Congruence between appropriation and provision rules* and local conditions: The rules conform to local conditions of the common-pool resource, such as its spatial and temporal heterogeneity.

3. *Participation of resource appropriators in decision-making*: Collective choice mechanisms allow that most individuals affected by the operational rules can participate in modifying these rules.

4. *Effective monitoring* of biophysical conditions and user behavior by monitors who are part of or accountable to the appropriators.

5. *Graduated sanctions* dependent on the severity and context for resource appropriators who violate the operational rule.

6. *Conflict resolution mechanisms* that are relatively cheap and easily accessible.

7. *Minimal recognition of rights to organize* for communities of resource appropriators, so that rights of appropriators to devise their own institutions are not challenged by external governmental authorities.

8. *Organization in the form of multiple layers of nested enterprises*, allowing for cross-scale physical relations and cooperation (see COX *et al.*, 2010 on Principle 8).

Acknowledging the limited specificity of this broad scale introductory assessment to institutional determinants of collective action, the design principles describe a simplistic reality that need to take into account a variety of configurations underlying the principles, such as the characteristics of the resource system, the attributes of the actors (e.g. appropriators) or the context in which the system is placed (COX *et al.*, 2010; OSTROM AND COX, 2010). In that sense, the design principles represent a valuable element for a diagnostic approach applied in the context of collective action research and facilitate the reduction of complexity through their level of generalization (OSTROM AND COX, 2010). As collective action theory and research advances, greater emphasis is dedicated to the social context in which the interactions of actors and resources are embedded (RUDD, 2000). Against this background, attributes of the community like group size or heterogeneity (JANSSEN AND OSTROM, 2001; VAN LAERHOVEN AND BARNES, 2014), the culture and history as well as norms of trust and reciprocity (BASURTO *et al.*, 2013a; MURRAY, 2008; PRETTY, 2003) increasingly come to

the fore. Research on conditions for collective action undoubtedly offers achievements for the advancement of context-sensitive institutional arrangements for natural resources management. In the following chapter, the significance of the social dimension is presented in the context of fisheries management and resource conservation.

2.1.3 Fisheries Management and Conservation Aims

The highly mobile resources of exploited fish species are generally characterized as common-pool resources, where exclusion of actors is difficult and subtractability is high (GRAFTON, 2005, p. 757; see Table 2.1) and quasi open-access situations emerge due to the difficulty of enforcing restrictions in the race for fish (ARLINGHAUS *et al.*, 2002, p. 282). Emanating from this, HILBORN (2007b) highlighted that "managing fisheries is managing people" in that success is immanently linked to the incentives of actors. Incentives can be generated in various ways and relate to a range of objectives. Given the objective of economically feasible fisheries, an example for an incentive-based approach is the scheme of Individual Transferable Quotas (ITQs). Despite the positive economic and partly social effects that are attributed to this scheme of private – but tradable – fishing rights (GRAFTON, 1996) in conjunction with defined Total Allowable Catch (TAC), their success in achieving environmental objectives of stock conservation is contested (ACHESON *et al.*, 2015; VAN PUTTEN *et al.*, 2014).

Best Practice (Marine) Protected Areas? From an ecological viewpoint, the answer to resolve the common-property dilemma had often supposedly been found in top-down state controlled or private management regimes that widely applied strict protection to halt further overexploitation (cf. HARDIN, 1968). Examples are found for freshwater ecosystems like the Danube Delta or Lake Baikal (SAUNDERS *et al.*, 2002) as well as for the highly industrialized and capitalized marine fisheries (BERKES *et al.*, 2001). After years, scientists and practitioners arrived at the conclusion that these conventional top-down protection systems often failed to produce sustainable outcomes for ecosystems and resource users, and there was evidence of still declining fish stocks (CAVEEN *et al.*, 2015). Given the great commercial interest in marine fisheries, the approach of Marine Protected Areas (MPAs) had developed rapidly as a new management tool for resource conservation alongside sustainable use, primarily promoted by environmentalists (AGARDY *et al.*, 2003; JENTOFT *et al.*, 2007). With the purpose of "contributing to the maintenance of biodiversity, ecological processes, and sustainable resource usage" (SUMAILA *et al.*, 2000, p. 753), MPAs comprise areas of defined resource use next to strict protection, e.g. through no-take zones.[5] In the debate about the effects of MPAs and the

[5] Definition of Protected Areas according to IUCN (2008): A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.
A comprehensive overview of design options for MPAs is for example given in KELLEHER (1999).

success in achieving the alignment of both sustainable resource use and nature conservation, criticism on using this kind of management tool as blueprint for marine fisheries increasingly became part of the debate, highlighting the importance of context specific management approaches (AGARDY *et al.*, 2003; JENTOFT *et al.*, 2007; LUBCHENCO AND GRORUD-COLVERT, 2015). Several studies show that an integration of the user side in the ecology dominated management process is critical for the success of protected areas also beyond the environmental system (FRIEDLANDER *et al.*, 2003; BAVINCK AND VIVEKANANDAN, 2011; HICKS *et al.*, 2014). In their study on levels of compliance and drivers in Costa Rican MPAs, ARIAS *et al.* (2015) show the beneficial connection of user participation to higher levels of rule compliance, a finding which is supported by KARPER AND LOPES (2014) and VITERI AND CHÁVEZ (2007), who add shared community values as well as social/peer pressure as important drivers for rule compliance. POLLNAC *et al.* proceed in showing the relation between the social and the ecological system through linking rule compliance in a marine reserve and fish biomass, where compliance itself relies on a complex net of socio-economic factors "rather than simply enforcement" (POLLNAC *et al.*, 2010, p. 18265) or purely economic incentives (VITERI AND CHÁVEZ, 2007).

Collaboration in Fisheries Management Both the described incentive-based ITQ system and MPAs are examples for management tools designed to avoid the overexploitation of aquatic common-pool resources. However, to tie in with the empirical evidence provided by collective action research, the design of institutions for the governance of common-pool resources might also be collectively accomplished through or with the input of the local stakeholders, taking into account the social and cultural context at both the micro (individual) and macro (society) level (OSTROM, 1990; BASURTO *et al.*, 2013a; HECK *et al.*, 2015). Empirical case studies revealed that along with the design principles already defined by OSTROM (1990), attributes at the individual and the community level as well as external factors like the social, economic and political setting affect the ability of actors to self-organize (POMEROY *et al.*, 2001). Among these factors, the development of a common understanding and shared mental models, the actor's commitment to the area, established norms of trust and reciprocity as well as an appropriate leadership were likely social drivers for successful natural resource management (JANSSEN AND OSTROM, 2001; RUDD, 2000).

Drawing on findings from collective action research and insights on the social dimension of fisheries, e.g. through MPA outcomes, the implementation of decentralized management along with the (re-)allocation of at least part of the management responsibilities to the local level has been increasingly promoted during the last years (JENTOFT *et al.*, 1998; HARKES, 2006). Objectives of collaborative management approaches, also referred to as co-management[6]

[6] Definition of co-management: "Co-management is the sharing of power and responsibility between the state and resource user groups in the management of natural resources (Pinkerton, 1989 cited in BERKES *et*

generally seek to align socially desirable outcomes – such as equity – along with ecologic objectives, e.g. resource conservation (CINNER AND HUCHERY, 2014). In order to establish collaboration, participatory processes are required that bring together concerned stakeholders along the vertical gradient on which the management is based, hence the actors with assigned responsibilities at the national, regional and local scale (CARLSSON AND BERKES, 2005). Stakeholder participation is able to increase the likeliness of effective management through a variety of factors, e.g. higher levels of perceived legitimacy of institutions through collective decision-making, the establishment of shared norms and mental models among actors (MATHEVET *et al.*, 2011), and the creation of social trust, e.g. between state and community as shown in SINGLETON (2000). Moreover, collaboration among stakeholders is able to strengthen the communication between actors and through recognizing and developing joint objectives, thereby creating networks, e.g. for information and knowledge exchange – in turn, communication itself enables cooperation (KOPELMAN *et al.*, 2002).

Participatory approaches are necessary in small-scale fisheries, because, as BERKES *et al.* (2001, p. 33) note, they "[...] are virtually unmanageable without the input and cooperation of stakeholders". However, participatory or community-based processes "are challenged by the social realities of competing interests about the use and management of many environments" (JONES *et al.*, 2016) and co-management approaches are not exempt from failure, as ONYANGO AND JENTOFT (2007) showed for Lake Victoria. Decentralized management approaches need to account for locally established operational rules and and the collective-choice mechanisms shaping these in order to achieve congruence between formal institutions and the social context, mirrored in a group's "interests, values, beliefs and psychological needs". EPSTEIN *et al.* (2015) conceptualized this congruence of policy designs and their according institutions together with the social context as social fit (see also DECARO AND STOKES, 2013). Following the understanding of EPSTEIN *et al.* (2015), social fit comprises three core dimensions: the congruence of operational rules and the social context, the satisfaction of stakeholder needs and expectations in the rule-making process, and the alignment of institutions with the scale of social organization. To the latter, MEEK (2013) adds the notion that co-management regimes with vertically distributed responsibilities and corresponding nested institutions are an opportunity to derive at social fit through congruence of locally established norms and formal institutions. The institutional fit as part of the social fit also refers to the ecological system, where harmony between institutions and the characteristics of the ecological system should be obtained, resulting in a social-ecological fit (EPSTEIN *et al.*, 2015). However, since the targeted social-ecological fit of a system is influenced through a complex interplay of a variety of variables, fit of one dimension might also produce misfit for the other (BODIN *et al.*, 2014); i.e., the establishment of a strict protection regime designed for the protection endangered species might fail when omitting associated "social costs" (MASCIA

al., 2001, p. 34).

et al., 2010, p. 1428).

Concluding on the findings from above, the pivotal role of the social dimension along with aspects of participation, legitimacy, compliance, trust and networks for natural resource management regimes in general and fisheries in particular is highlighted. Given the importance of sustainable small-scale inland fisheries for millions of actors, identifying drivers for socially and ecologically sound management is necessary. As collective action research has shown, these drivers can be found among characteristics of communities. Exploring the conditions under which social organization can lead collective action is part of the concept of social capital.

2.2 Social Capital

2.2.1 Development and Definitions

The failure of previous management approaches brought along a widened attempt to study factors which influence the ability of groups and communities to self-organize, hence their potential for collective action. A promising and widely promoted concept is that of social capital (OSTROM, 2007b), which – deeply rooted in seminal works of sociology – found its theoretical origins in the work of PIERRE BOURDIEU (1980, 1986) and JAMES COLEMAN (1988), who described social capital as "a resource for action" (COLEMAN, 1988, p. S95). Coleman's perception of social capital, substantially influenced by rational choice theory, resulted from the amalgamation of two theories on the relation between social organizations and economic activity (*ibid.*, p. S97). The notions of BOURDIEU and COLEMAN exhibit a very functional perception of social capital as a resource, powerful enough to enable a mechanism by which actors obtain benefits. While BOURDIEU's work relies on a reductionist view, seeing the benefits that arise for an individual through social capital (PORTES, 1998, p. 4), COLEMAN, though a rational choice theorist, further emphasizes the linkages of the structural and cultural dimension[7] of social capital and it's importance for the creation of human capital (PORTES, 1998). The cultural dimension refers to the internal aspects of individuals, shaping society through norms, attitudes and value systems. These societies are at the same time shaped through the structural dimension of social capital, consisting of the different organizations which exist in a society and their networks, e.g. found in families, social groups, etc. (KRISHNA AND SHRADER, 2002; BALLET *et al.*, 2007). Sociologists who contributed to the development of the concept agree that the interaction among individuals is the source of potential benefits, precisely because individuals or groups engage in social networks. After more than a decade of theoretical considerations on the concept, the political

[7] The dichotomy between the structural and cultural dimension was introduced in the work of KRISHNA AND SHRADER (2002).

scientist PUTNAM (1995) finally slingshot the concept in the broader public with his popular empirical application of the concept on the American society. The main novelty of PUTNAM's work is the conceptualization of social capital as an asset that "can be crafted and manipulated by agents to obtain favorable [...] outcomes" (ISHIHARA AND PASCUAL, 2009, p. 1553). Through this twist, the concept increasingly found its way into decision making processes, e.g. concerning natural resource management, as will be further elaborated in Section 2.2.5.
The concept's historical development and popularity might be the reasons why it is impossible to find just one valid definition (LOCHNER *et al.*, 1999; DURLAUF, 1999). The following examples show the variety of attempts to overcome this dilemma throughout the years.

> "[A]ggregate of the actual or potential resources which are linked to the possession of the durable network of more or less institutionalized relationship of mutual acquaintance and recognition" (Bourdieu 1986, cited in ISHIHARA AND PASCUAL, 2009, p. 1553)

> "[Social capital] refers to features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit." (PUTNAM, 1995, p. 2)

> "[S]ocial capital is an instantiated informal norm that promotes cooperation between two or more individuals." (FUKUYAMA, 1999, p. 1)

> "[...] social capital is a set of values and relationships created by individuals in the past that can be drawn on in the present and future to facilitate overcoming social dilemmas. [...] We identify trustworthiness, networks, and institutions as three basic forms of social capital." (AHN AND OSTROM, 2002, pp. 3,4)

> "The value of trust generated by social networks to facilitate individual and group cooperation on share interests and the organization of social institutions at different scales." (BRONDIZIO *et al.*, 2009, p. 255)

This list of possible definitions is far from exhaustive, but already demonstrates the mere flood of notions, leading to the "ill-described" concept, as discussed by DURLAUF (1999, p. 2). Nevertheless, re-occurring aspects which seem to be endorsed to some extent throughout the scientific community are related to *trust*, *networks* and *institutions*. The earlier distinction in cultural and structural social capital is increasingly being replaced by the terminology of cognitive and structural social capital, as for example used by UPHOFF (2000) and GROOTAERT AND VAN BASTELAER (2002), respectively relating to subjective norms, attitudes, and beliefs, as well as the rules and networks manifested in social organization. Mainly the mutual existence of structural and cognitive social capital enables cooperative behavior, and, though not exclusive, "in practice [...] it is unlikely and difficult for either to persist without the other" (UPHOFF, 2000, p. 218).
Of peculiar interest is the view on the relation of social capital to other forms of capital – physical capital which is "embodied in tools, machines, and other productive equipment"

(COLEMAN, 1988, p. S100) and human capital, "embodied in the skills and knowledge acquired by an individual" (*ibid.*). For social capital, both congruent and distinctive characteristics to other forms of human-made capital (physical and human capital) can be found. As is the case for physical capital, a stock of social capital can be built up over time, which produces some sort of positive or negative output (GROOTAERT AND VAN BASTELAER, 2002). But a contrast can be found in the maintenance of this stock. Whereas physical capital, like water pipelines for irrigation, decreases through intensive use, social capital increases by being used, as relations among actors establish trust and reduce transaction costs for collaboration (cf. GROOTAERT AND VAN BASTELAER, 2002; BRONDIZIO *et al.*, 2009). When not used, social capital deteriorates rather quickly and possibly needs large investments, e.g. long time, to rebuild, especially since it cannot be generated through single individuals but concerns groups or even societies. Therefore, from the viewpoint of many economists, the term "capital" is misleading for the concept (SOLOW, 1999), since it involves intrinsic rather than economic motivation for action, as ARROW (2000) argues. Regardless of how the concept might be termed in the future, its usefulness for enabling successful resource management for both use and protection is recognized. Following the definition of AHN AND OSTROM (2002) that will be used to conceptualize social capital throughout the study, the three basic elements of *trustworthiness*, *networks* and *institutions* are identified. They will be elaborated in-depth in the following sections.

2.2.2 Trust and Trustworthiness

Ubiquitous and yet elusive, trust might be the most important and most difficult element of social capital at the same time. SCHWEERS COOK (2005, p. 6) emphasizes the role of trust:

> *"In a world without trust, it has been argued, life is harsh and social order precarious. Without trust, the background institutions that typically ensure commitments, enforce contracts, provide sanctioning and monitoring, and generate the social and organizational conditions for cooperation must do all the work required to create social order."*

To start by a first assessment of the meaning of trust, a differentiation of two forms of trust is possible, following PRETTY AND WARD (2001): trust in individuals we know, e.g. family members, and trust among strangers. STORY *et al.* (2015) distinguished interpersonal (relational, as in SCHWEERS COOK, 2005 or strategic, as in USLANER AND BADESCU, 2004) and generalized trust, respectively. This also reflects two vertical levels of trust, where strategic trust is tied to a micro-level, among individuals. Generalized trust is allocated at the macro-scale, linking groups and individuals, for example in trading activities (cf. SCHWEERS COOK, 2005, p. 9), relying on an individual's optimism regarding the trustworthiness of others, and therefore allowing cooperation among strangers (OSTROM, 2007b, p. 14). So

what is necessary in order to create trust in general? Is trust a prerequisite or an effect, or more precisely, is trust a phenomenon that creates norms and institutions, or do norms and institutions create trust?

Several authors elaborate trust in a reductionist view and explain it in the way as described by SOBEL (2002, p. 148), as "the willingness to permit the decisions of others to influence your welfare". This view on benefits deriving from trust relations also implies the notion that other actors need to be perceived as trustworthy in order to establish those relations. It derives from a concept of rationalist actors, who are able to define their most beneficial action options anytime. In contrast to this, in their comprehensive work on how trust is embedded in the social capital concept, SIX *et al.* (2015) contend a vision of "optimistic grounding of social trust" (SIX *et al.*, 2015, p. 160), relying on informal institutions and norms. The evolution of norms and underlying values, shared among individuals, is not restricted to individual selfish motives, but rather mirrors a "common interest" (JONES *et al.*, 2012, p. 56), connecting the individual and the group/community/society level. RUDD (2000, p. 133) described a "self-reinforcing cycle" for effects of trust and reciprocity – trustworthy individuals with a good reputation enhance social trust of other actors, so that increased returns are seen alongside reduced transaction costs for organization. Social trust therefore is both a prerequisite for collective action and an outcome of such activities, based on an interpersonal level.

Besides interpersonal trust, institutional trust refers to the amount of trust that individuals show towards existing institutions, hence they are "considering the extent they trust the institution to fulfill its role in a satisfactory manner" (HUDSON, 2006, p. 46; HOVARDAS AND POIRAZIDIS, 2007). If individuals trust institutions, e.g. those designed for monitoring and enforcement of regulations, they perceive institutions to be more legitimate and to be more beneficial in achieving a desired outcome, as JONES *et al.* (2012) showed for different protected area policy options. Furthermore, when trust in "suitable punishment" (DASGUPTA, 2000, p. 49) is present, incentives of compliance will evolve in a circle of trust, since complying behavior increases an actors own trustworthiness in the eyes of others. At the same time, institutional trust can serve as a foundation for social capital, since actors are more likely to stick to formal and informal institutions, which makes it easier for others to trust in them, hence creating social trust (USLANER AND BADESCU, 2004; HUDSON, 2006). Though many scholars emphasize reciprocity as a proxy for the assessment of trust among actors, this study follows the notion that reciprocity is a specific norm and a basis for trust, in line with MURRAY (2008).

2.2.3 Social Networks

Another element of social capital is summarized as social networks, which are found to be of particular relevance for the success of resource management regimes, due to their role e.g. in facilitating collective action (see e.g. BODIN AND CRONA, 2009; ADGER, 2010;

MERTENS *et al.*, 2015). Networks among individuals or organizations often operate at different levels, ranging from local networks among community members to regional levels among user associations or national level, connecting governmental authorities. Besides this differentiation at the vertical scale, elements of networks can further be classified into bonding, bridging and linking ties, according to their ability to relate actors. The use of this terminology for social ties within the concept of social capital is often not consistent. Whereas, for example, BALLET *et al.* (2007, p. 367) only referred to "bridging social capital", other authors refer to "types of social capital", as e.g. in PRETTY AND SMITH (2004) or bonding, bridging or linking ties (BODIN AND CRONA, 2008). As BARNES-MAUTHE *et al.* (2014) noticed, the deviations are used interchangeably, but equally refer to the nature of the social ties in a given network.

Bonding ties exist between actors of the same sub-group as defined in GRAFTON (2005, p. 756) as "'strong ties' within groups of like-minded individuals", e.g. fishermen[8] from the same community who use the same gear. These ties act at a limited spatial scale, since they presume the exchange of information in order to develop a shared like-minded state. At a larger spatial scale, *bridging* ties enable different subgroups to connect, e.g. fishermen from different lakes, hence permitting "linkages across similar, but different, groups or social networks" (*ibid.*). The third level – *linking* ties – focus on the hierarchical positioning of actors within the network. Linking ties are found to "cross social divides" (BARNES-MAUTHE *et al.*, 2014, p. 396) and spatial scales, e.g. between officials from governmental bodies and small-scale fishermen (schematically presented in Figure 2.1). The latter two types of relations, bridging and linking, are also referred to as weak ties, since they implicate much looser relations among actors. Networks are an important aspect regarding the governance of natural resources at the community level, e.g. as emphasized in SANDSTRÖM AND ROVA (2010), who discussed implications arising from co-management networks in two Fishery Conservation Areas in Sweden. To assess the characteristics of social networks, network density, network centrality, fragmentation of the network into sub-networks, and the ratio of bonding to bridging ties are prominent measures (BURT, 2000; KOWALSKI AND JENKINS, 2015; GRANOVETTER, 1973), e.g. applied by BODIN AND CRONA (2008) in a case study in order to explain unsustainable use patterns in a Kenyan fishing community.

At the level of individuals, BARNES-MAUTHE *et al.* (2014) showed that characteristics of the individual, like ethnicity, contribute to variations in networks and therefore also influence the amount of social capital available at the community level. Through networks, actors are able to obtain information, gain, share and distribute (new) knowledge. As BURT (2000) pointed out, two different approaches are associated with the role of networks in information sharing processes, namely network closure and structural holes. Network closure comprises dense networks among actors, fostering the establishment of a shared normative understanding

[8] Throughout the thesis the terms fisher(s) and fisherman/fishermen are used interchangeably, including also female fisher(s) in the latter term.

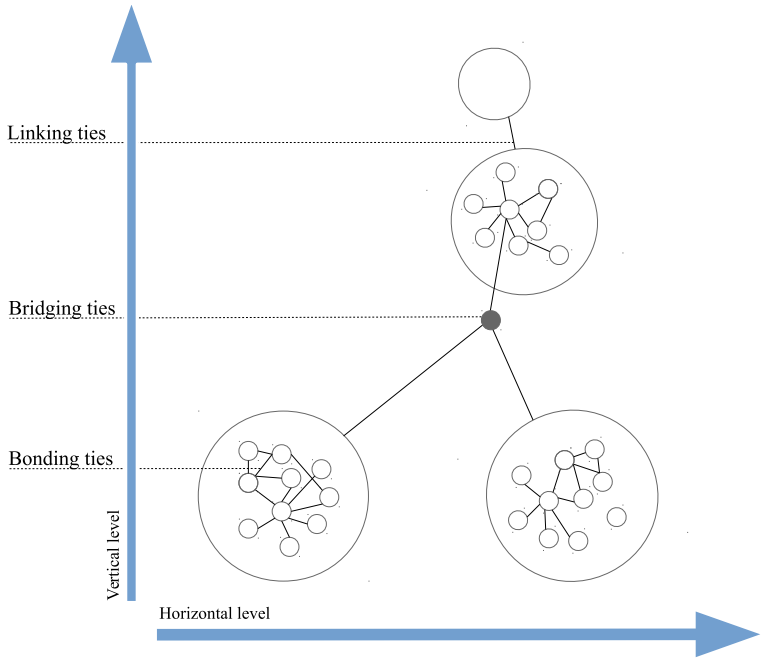

Figure 2.1 – Bonding, bridging and linking network ties.

(GARGIULO AND BENASSI, 2000). Access to information is less costly because of cohesive bonding ties, and in presence of a threat of social sanctioning reputation and trust mechanisms are more likely to evolve (BURT, 2000). It is argued that network closure positively affects the ability of actors to pursuit a common goal, e.g. through engaging in collective action (GARGIULO AND BENASSI, 2000).

In horizontal networks with strong bonding ties, knowledge about other actors can also act as a facilitator of trust relationships through a reputation of trustworthiness (cf. OSTROM AND AHN, 2001). In contrast to these exclusive networks based on strong cohesive (bonding) ties, the strength of weak ties (cf. GRANOVETTER, 1973) between groups is emphasized in the notion of structural holes as basis for social capital. Whereas two groups of actors are defined by their strong internal bonds, the structural hole between those groups provides opportunities for brokerage in favor of information exchange and knowledge transfer. Individuals who span bridging ties and act as broker for otherwise disconnected groups, have a relative advantage through the control of the information flow (BURT, 2000; BARNES-MAUTHE *et al.*, 2014). For the generation of common mental models, ISHIHARA AND PASCUAL (2009) ascribed bonding ties within the community as being most influential, whereas the distribution of this common knowledge primarily benefits from bridging ties. In this regard, trust and the constitution of a network are linked and are able to re-enforce, increase or decrease each other according to the given situation. Besides horizontal networks, the hierarchical structures comprise implications for the management of natural resources, e.g. through the presence of central individuals with key functions regarding conflict resolution, enforcement of regulations

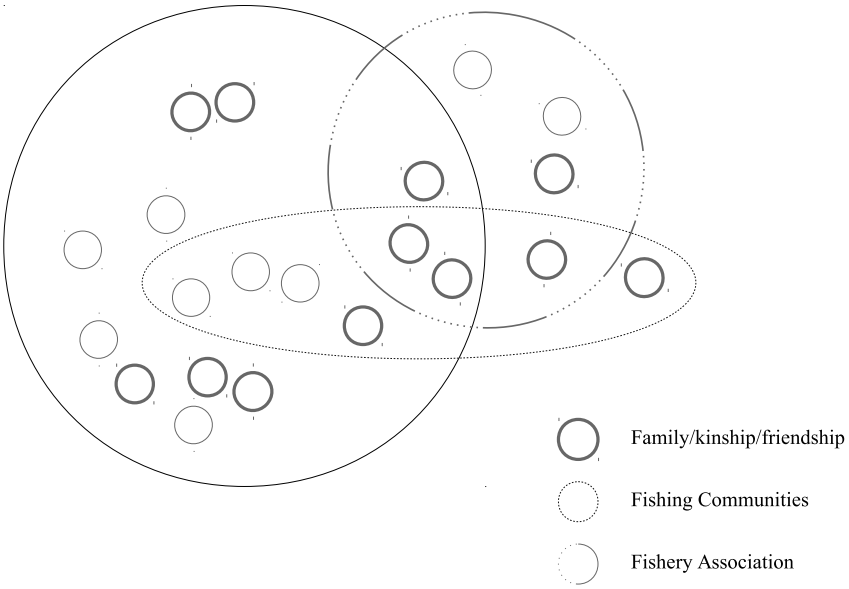

Figure 2.2 – Networks of trust, adapted from FUKUYAMA (1999).

or alike, often connected to linking ties. The constitution of networks of trust, as elaborated in FUKUYAMA (1999), links these two elements of social capital and attaches networks to a certain extent, which is determined by trust. For example, trust in a fishing community might span across various actors but might not involve all members of the fishery association. Family and friendship bonds of trust might also apply to otherwise excluded actors, who are not part of any other trust network, e.g. the fishery association (see Figure 2.2).

2.2.4 Institutions

The third element of social capital is especially relevant in the context of the management of natural resources, since it provides structures even in the absence of networks and trust. In the neo-institutional[9] understanding, institutions are complex structures, the formal and informal "rules of the game", crafted to shape human interactions (NORTH, 1990). In their function, "[i]nstitutions impose restrictions by defining legal, moral, and cultural boundaries, distinguishing between acceptable and unacceptable behavior", as SCOTT (2014, p. 58) points out. The distinction in formal and informal institutions (OSTROM, 2005; BARNETT AND EAKIN, 2015), similar to Scott's legal and moral boundaries, can be translated into formal laws and informal norms and values or taboos, equally designed to organize actions, e.g. fishing activities through permits or restrictions and the definition of sanctions in case of rule-breaking behavior (COOKE *et al.*, 2013). Differences among formal rules and informal

[9] Acknowledging the difference between classical institutionalism and the new institutional understanding, for a comprehensive review see e.g. IMMERGUT (1998).

norms can be found in the enforcement processes, in that norms are mainly enforced by actors themselves without adhering to higher level authorities (cf. OSTROM, 2010). Formal rules at the other hand are characterized by processes of legal sanctioning (BASURTO *et al.*, 2013b). According to OSTROM (2005), the totality of institutional arrangements that governs actions and outcomes of a particular situation can be distinguished at three levels: *operational rules* concern everyday practical decisions of actors, *collective-choice rules* specify individuals entitled to decide on operational rules and participate in operational activities, and *constitutional rules* effect collective choice rules in that they decide on who is eligible to participate at collective choice processes. In a hierarchical perspective, constitutional-choice rules are positioned at the highest level since they shape the underlying collective-choice rules, which then act on operational rules. Outcomes at each level in turn possibly affect the rules at all levels and lead to adaptations. According to the level, these adaptations might be implemented at different pace: fastest at the operational level and slowest at the constitutional level (ANDERIES AND JANSSEN, 2013). All types of governance regimes for the management of natural resources – from centrally planned to community-based management – comprise a peculiar set of rules at each of the described levels.
Within the concept of social capital, institutions are tightly linked to networks and trust. SIX *et al.* (2015, p. 155) state that "institutions are understood as trust producers, which assist in preventing defection and opportunism". This link also becomes evident when examining the relation of institutional trust and social trust, as outlined previously (cf. p. 17). Rules-in-use, e.g. for the use of natural resources, are formed by and form themselves the norms and values underlying the behavior of actors and, hence, feedback on the networks and trust (MCCAY AND JENTOFT, 1998). Through these interactions, cause and effect of social capital are embedded in what BRONDIZIO *et al.* (2009, p. 261) termed "logical circularity". In the same regard, institutions and networks are tightly coupled in webs of interactions where regulations are the strings to which participating actors are tied. The compliance of actors to these guiding institutions, formal as well as informal, is defined by their perceived legitimacy – the acceptance of existing and applied regulations in a particular case of natural resource management. Related to questions of power distribution and participation, co-management arrangements provide a promising means to enhance legitimacy and subsequently compliance, but need to be critically reflected for each context, since blueprint approaches might rather have unintended (negative) consequences (cf. JENTOFT, 2000a).

These three primary elements of social capital can be studied at the micro-level, i.e. an individual's norms and behavior with respect trust and reciprocity, up to the aggregated macro-level, i.e. the scale of national societies and economies (RUDD, 2000). Coequally, the community level represents a meso-scale. These three dimensions allow for consistency of the scales used to describe network structures and social capital alike, and the analysis of links and

feedbacks across those levels. For example, networks at community level enable information flow that ultimately influences or alters international policies.

2.2.5 Collective Action and Social Capital

Throughout studies in various fields of research, scholars have found that some groups succeed and others fail in collectively solving problems. This becomes especially apparent in the light of internationally promoted success stories of co-management, or community-based management, approaches. Though OSTROM acknowledges that the "linkage of collective-action theories and the social capital approach is, however, at best, incomplete up to now" (OSTROM, 2007b, p. 3), the importance of consolidating both theoretical approaches is repeatedly stressed throughout the literature (SIX *et al.*, 2015; OSTROM, 2007b; BOWLES AND GINTIS, 2002). In this regard, MURRAY (2008) emphasized the role of cooperation for linking social capital and collective action. Cooperation establishes trust, which increases levels of cooperation and influences the success of strategies to solve collective action problems. Besides the level of trust (the repeated interaction in classical game theory) that is important for cooperation, other characteristics inherent to individuals and communities are relevant, namely "solidarity, reciprocity, reputation and personal pride" (MURRAY, 2008, p. 13). Through economic experiments STOOP *et al.* (2013) were able to show that in a social dilemma situations, reciprocity and recurring interaction increased the likelihood of cooperative behavior. In an environment where reciprocity is present and has been enjoyed previously, cooperation is likely and, in addition, more stable (see also LUBELL AND SCHOLZ, 2001). Interestingly, LUBELL AND SCHOLZ revealed some evolutionary traits of social capital at the parting of ways of trust/reciprocity and sanctioning institutions, where one exists in the absence of the other in order to sustain (or enforce) cooperation. It has been shown that presence or absence of a set of OSTROM's (2005) design principles alone is not able to explain collective behavior. Even with a majority of design principles present, community failure (MCCAY AND JENTOFT, 1998; BOWLES AND GINTIS, 2002) might as well occur as result of the particular community setting. Socio-economic attributes of community members, like available alternative livelihood strategies (CINNER *et al.*, 2009a), but also networks among actors and to other actors and groups are important determinants that enable the self-organization to solve social dilemmas of natural resource use (BODIN AND CRONA, 2009). Besides the nature of networks as connector of individuals, groups or organizations in an institutional point of view, networks and the associated flow of information decrease transaction costs of organization through cooperation (see RUDD, 2000, "self-reinforcing cycle"), and "circumvent the incentives to free-ride" (ISHIHARA AND PASCUAL, 2009, p. 1554). Therefore, these networks are contributing to the establishment of intrinsic motivations (in contrast to extrinsic motivations through formal monitoring and sanctioning), relevant – among other factors – in relation to an individual's

rule-complying behavior. Incentives for compliance with regulations concerning the use of natural resources are particularly important when dependency on these resources is high, as ARIAS *et al.* (2015) and CINNER *et al.* (2009a) stressed for fisheries in Costa Rica and Kenya, respectively.

Challenges in natural resource management are also attributed to the uncertainty of ecosystem dynamics, e.g. in the context of climate change (ADGER, 2010). Knowledge about the natural system and flexible institutions are necessary to be able to cope with the dynamics of feedbacks that arise through the complex interactions between the human and the natural system (LIU *et al.*, 2007). According to FOLKE *et al.* (2002), management systems that are able to adapt to changing environments provide an environment that enables the collaboration of different stakeholders and the integration of different knowledge systems, e.g. from scientists as well as from local resource users. In order to facilitate cooperation and knowledge exchange, e.g. for the co-management of natural resources, social capital provides a useful concept to understand the ties that connect actors, the networks of trust and the norms and institutions that underlie the actors' behavior (ADGER, 2010).

2.2.6 The "Dark Side" of Social Capital

Because of all convincing findings for the importance of social capital for governing natural resources, negative consequences resulting from configurations of trust, networks and institutions are often neglected. Illuminating the critical elements helps to reduce the risk of mis-use of the social capital concept as a panacea for solving social dilemmas (**?**). Challenges are found at the conceptual and the structural level. Commencing with the latter, a first downside is seen in the ambiguity of dense networks. While generally fostering exchange between actors, tight bonding ties might as well increase the distance between individuals and lead to the perception of in-groups and out-groups (BALLET *et al.*, 2007), or an understanding of "us and them" (see HERRERA-RACIONERO *et al.* (2015), who use this distinction in the context of institutional legitimacy and hierarchical power structures for fishery governance in Spain). This attitude might produce severe inequalities and as well result in (ethnic) homophily and group fragmentation, as was shown for the Hawaiian fishery sector by BARNES-MAUTHE *et al.* (2014). Research on social identity and resulting consequences for in-group and inter-group behavior relate strong identification with group values with two characteristics: firstly, in-group homogeneity, and secondly, increasing impermeability of group boundaries (TAJFEL AND TURNER, 2004; BROWN, 2000). Drawing on theories of intergroup relations, DAEDLOW *et al.* (2013) showed the influence of in-group cohesion for the management transition of East Germany recreational fisheries, where e.g. strong in-group connectedness hindered the establishment of shared norms with an out-group.

In their critique on social capital, ISHIHARA AND PASCUAL (2009) acknowledged the poten-

tial of networks to produce the often noted community failure (McCay and Jentoft, 1998; Jentoft, 2000b; Bowles and Gintis, 2002) in regard to the abilities for collective action. Due to the complex nature of social relations, another challenge can be seen in what Portes (1998, p. 15) described as "downward leveling norms". Group identity based on common knowledge and shared experiences, separates the group from e.g. a progressive general public, and ensures that any ambitions to adapt to new norms, attitudes or beliefs different from the group's are kept at a minimum (*ibid.*). Further, Portes (1998) identified excess claims on group members and restrictions on individual freedoms as negative consequences of social capital. This view is also reflected in Fukuyama (1999), who levels restrictions on individual freedom to the group level, considering that in-group behavior "reduces the ability of group members to cooperate with outsiders, and often imposes negative externalities on the latter" (Fukuyama, 1999, p. 5). There is agreement in that social capital is able to lower transaction costs, because less monitoring is needed in case of strong networks and general trust (Pretty and Ward, 2001). However, the initial establishment as well as the maintenance of social capital itself might be costly (Ballet *et al.*, 2007). The amount of persisting, and, importantly, the potential to build up community social capital are constrained by cultural traits of the actors, as for example Daniere and Takahashi (1999; in Ballet *et al.*, 2007) were able to show for reciprocal traits in Thailand.

These implications of negative social capital at a structural level are accompanied by conceptual constraints, limiting the theoretical validity. In this regard, four aspects need to be mentioned. Firstly, the most basic but pressing shortcoming is the lack of a consistent definition of what constitutes social capital across disciplines (cf. Lochner *et al.*, 1999; Bodin and Crona, 2008). This shortcoming is manifested in that a clear distinction of trust, trustworthiness and reciprocity is missing as much as a stringent theory on how these form or help to form social capital. As a consequence, the explanatory power of social capital within studies is often weak. Secondly, the lack of equity in scale regarding the application of the concept further reduces the comparability of cases (Durlauf, 1999; Bodin and Crona, 2008). Thirdly, critics emphasizes the need for universally definitions of key aspects for the concept, especially regarding trust, trustworthiness and reciprocity (Ahn and Ostrom, 2002) that would allow better comparison of studies from different fields of research. The fourth conceptual critique relates to the possibilities to measure social capital. At a national or international scale, survey tools like the World Values Survey were developed in order to gain comparable data on generalized trust (Ostrom and Ahn, 2001), which can then be used for cross-national comparisons, as e.g. in Uslaner and Badescu (2004). Quantitative social network analysis, applying measures such as network density and centrality (see e.g. Bodin and Crona, 2008), complement methods for the assessment of social capital. Nevertheless, as mentioned by several authors, particular difficulties are found for trust (trustworthiness/reciprocity), or more generally the assessment of normative ideas (Ahn and Ostrom, 2002; Story *et al.*,

2015). Whereas operational assessments of networks can be conducted quantitatively, trust is often approached through survey questions (cf. STORY *et al.*, 2015) or economic trust (and trustworthiness) games, as e.g. in BOUMA *et al.* (2008). Measurements are complicated, because the stated level of trust is also influenced by a cognitive dimension, expressed through a fear of retaliation, e.g. through revoking (economic) transactions, social ostracism through negative reputation or alike (KRISHNA AND SHRADER, 2002).
Concluding on the limitations outlined above, it becomes evident that a critical reflection on social capital is necessary in order to overcome the shortages of the concept and provide a non-biased analysis in the present work.

2.3 Social Capital in Post-Socialist Countries

So far, findings for social capital were mainly considered in a "western style", assuming a history of more or less democratic development and division of powers between state and market. This is critical since the "existing social realities" (MURRAY, 2008, p. 8) of different contexts might not be sufficiently acknowledged within the concept. But what is known about social capital in post-socialist societies, especially in Eastern and South East Europe? Does the transition from central planning and state control to market economy also affect the levels of trust and the networks within the society? MURRAY (2008, p. 4) provides strong evidence, since "socialist regimes and centrally planned economies changed the social fabric" of the countries. What PALDAM AND SVENDSEN (2001) labeled the "dictatorship theory of missing social capital" can serve as basic explanation for the mainly negative consequences that former communist regimes had for social capital. Through the all-embracing state control, negative, rather than positive social capital was built up. In some cases, even the destruction of social capital at the community level was found, e.g. when the regulations imposed on the community counteracted established norms and values (STANCIU AND IONIŢĂ, 2014). Social control had usually been exerted top-down in order to sustain the leadership's power, namely that of a totalitarian authority (PALDAM AND SVENDSEN, 2001). This had two consequences: on the one hand, state control hindered the formation of social bonds and limited experience with collective approaches for solving problems, since in the eyes of the ruling authority, the danger of non-obeying civil organizations was too big. On the other hand, the totalitarian state reduced trust and cooperation that reached beyond very limited networks (of trust) among family members or close friends, formed for reasons of convenience, e.g. for exchange of commodities or mutual help in times of need (USLANER AND BADESCU, 2004, p. 38).
As reaction to increasing evidence of severe degradation, environmental protection most often resulted in the creation of areas of strict protection, e.g. large reserves or National Parks (STANCIU AND IONIŢĂ, 2014). However, as these were often "paper parks" the effect for conservation was limited, as e.g. MAZURSKI (1991) reported for Polish protected

areas. In the centralized regimes, decision-making was subject to the state authorities and institutions were crafted without public participation (KLUVÁNKOVÁ-ORAVSKÁ *et al.*, 2009). Following the socialist ideology, the attitude that nature had no intrinsic value shaped the norms and values of large parts of society (KLUVÁNKOVÁ-ORAVSKÁ *et al.*, 2009). These norms together with the lack of opportunities to participate in the decision-making led to a limited public interest and awareness regarding concerns of environmental stewardship (STANCIU AND IONIŢĂ, 2014; MAZURSKI, 1991). Besides the formal regulations of the centrally-planned management system, low levels of self-organization or emerging informal institutions for environmental protection or resource management had been reported for European socialist countries (KLUVÁNKOVÁ-ORAVSKÁ *et al.*, 2009), whereas e.g. in socialist Mongolia ULAMBAYAR (2015) reported locally adapted pasture management and leadership. After the collapse of European socialist regimes in 1991/1992 the expectation that a "civil society with trusting and tolerant citizenries" (USLANER AND BADESCU*, 2004*, p. 39) will surface immediately was faced with prevailing distrust that was "learned" during communist times (STANCIU AND IONIŢĂ, 2014). During the period of transition towards democracy, former institutions were left behind weak, misused by powerful elites and distrusted by the majority of the public (ROSE-ACKERMAN, 2001). This time is also seen as the spark for predation, primarily corruption (ROSE-ACKERMAN, 2001).[10] When institutions responsible for the enforcement of regulations are weak, the lack of enforcement enables the development of corruption, a phenomenon frequently observed in transition and developing countries (cf. USLANER AND BADESCU, 2004; AKPALU *et al.*, 2009; SUNDSTRÖM, 2013). Through using corruption as proxy for trust, PALDAM (2001) established the link between social capital and corruption. The notion of corruption as form of norm or informal institution guiding actors' behavior, e.g. in natural resource management, further strengthens the link to social capital. In that corruption works as "extra-legal resource management institution" (ROBBINS, 2000, p. 423), it challenges sustainable management in various ways: through creating perverse incentives, fostering inequality, e.g. through powerful elites and decreasing the likelihood of collective action (ROBBINS, 2000; SCHMIDT AND THEESFELD, 2012). In the case of South African small-scale fisheries, SUNDSTRÖM (2013) highlighted the manifold interactions between trust, networks and institutions at multiple scales, ranging from the individual and local to the national level, and the feedback processes equally present at different scales. The study of social capital in complex social-ecological systems needs to account for multiple interactions and feedbacks. Establishing also the link to the historical background is of particular importance for the social dimension, as demonstrated for the post-socialist context.

[10] Definition of corruption in natural resource management: "the use or overuse of community (state, village, city, etc.) natural resources with the consent of a state agent by those not legally entitled. It is the extension of existing non-economic relationships (family, "friendship", and other socially obligating relations) to determine access to these use rights through normative systems of expected exchange." (ROBBINS, 2000, p. 425)

In the following chapter, a structured approach for the study of SES is introduced.

2.4 The Social-Ecological Systems Framework

2.4.1 Background

In the common-pool resource context, the Institutional Analysis and Development framework (IAD), designed to study multi-tier institutional arrangements and the underlying structural variables in various contexts related to the management of natural resources (OSTROM, 1986; IMPERIAL, 1999; OSTROM, 2011; THIEL *et al.*, 2015) experienced widespread application (e.g. IMPERIAL AND YANDLE, 2005; COLEMAN AND STEED, 2009; DONG *et al.*, 2009). With contributions from a great number of scholars, the IAD framework was mainly developed within the Workshop in Political Theory and Policy Analysis at Indiana University. It acknowledges the strong linkages that tie humans to the state of nature and therefore incorporates characteristics of the biophysical sphere into the analysis of change and development of institutions for natural resource management (OSTROM, 2011). In the center of analysis lies the action arena with the components of the action situation and the actors, e.g. a particular fishery (action situation) and the actors that affect or are affected by the respective regulations (participants). The action arena is influenced through exogenous variables (e.g. biophysical conditions such as the reproductive capacity of targeted fish stocks), and through interactions that lead to outcomes (e.g. monitoring and sanctioning activities ensure desired stock sizes), which can then be evaluated. Figure 2.3 illustrates the structure of the IAD framework.
Feedbacks between these analytical units show the complexity of inter-linkages. A major advantage of the IAD framework is the inclusion of a variety of contextual factors, constraining the action arena besides the biophysical characteristics through the rules used by participants, and the general setting of the action arena in the social, cultural and economic context, e.g. of a community (OSTROM, 2005). The focus on institutions, defined as formal and informal rules and regulations, within the framework allows a diagnostic procedure of structures that lead to the development of or changes in institutions in order to solve a given problem (IMPERIAL, 1999). Scholars' growing interest in studies of social dilemmas arising from common-pool resource settings raised the importance to equally account for the ecological and social realm in order to analyze dynamics of change (FISCHER *et al.*, 2015). Supported by evidence from a great number and diversity of case studies on the management of natural resources, thorough understanding of not only the ecological or social system, but rather the synthesis of knowledge revealed drivers and barriers important for overcoming social dilemmas (cf. SCHLÜTER AND MADRIGAL, 2012; BEGOSSI *et al.*, 2012; HUNT *et al.*, 2013).
In social-ecological systems, social and ecological interactions and processes are inherently linked by non-linear feedbacks among variables of the human and the natural system (ANDERIES *et al.*, 2004; LEVIN *et al.*, 2013). Adopting such a social-ecological systems (SESs)

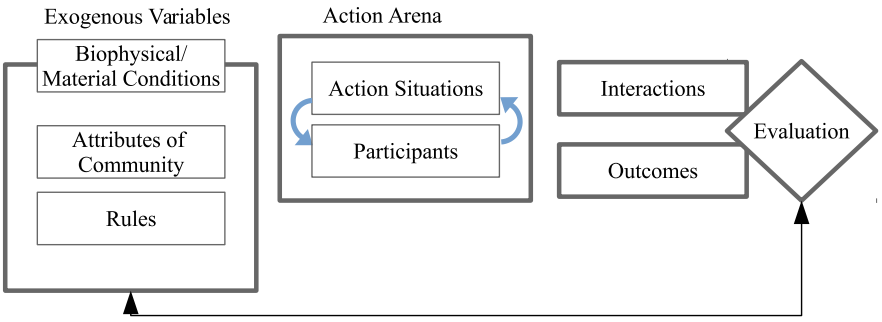

Figure 2.3 – Structure of the IAD framework, modified from OSTROM (2011).

perspective advanced the search for sustainable solutions at various scales, ranging from local to global *(*FISCHER *et al., 2015;* GLASER AND GLAESER*, 2014)*, e.g. where policy decisions of state authorities have consequences at ecosystem level when applied at a local scale. The nested character of the human-environment relation exacerbates the consequences of human actions for ecosystems (LEVIN *et al.*, 2013; BINDER *et al.*, 2013), and negative effects resulting from unsustainable behavior increasingly feedback on the social and environmental system alike, e.g. when clear-cut land leads to mudslides, destroying settlements and agricultural land. Therefore, the development of an understanding of which factors or combination of factors explain outcomes with respect to sustainability across different types of SES is crucial for the effective design of management regimes (cf. HINKEL *et al.*, 2015) while not falling into the trap of applying panaceas (OSTROM, 2007a). As LEVIN *et al.* (2013, p. 125) emphasized, SES are "complex adaptive systems", and at least four main characteristics need to be factored into their management: nonlinear dynamics, spatial and temporal scales, heterogeneity associated with scales, and prevailing risk and uncertainty due to the complexity of systems (LEVIN *et al.*, 2013, p. 125 ff.).

In order to provide a tool with which to guide the study of those complex systems, OSTROM (2007a) developed the Social-Ecological Systems framework. Through the decomposition of SESs into multiple subsystems, complexity is reduced in a systematic approach. The initial IAD framework serves as the basis for the SES framework, thus fostering the interdisciplinary application by social scientists, economists and ecologists, via the integration of different sets of qualitative and quantitative data, theories, models and concepts. The framework contributes to questions related to natural resource management insofar as it helps to identify structural variables at different tiers of the social as well as the ecological system, involved in processes resulting in aspired, as well as unwanted outcomes for the focal SES (cf. OSTROM, 2007a). Although the importance of the SES framework is emphasized at this point, there are several more frameworks specifically dealing with complex human-nature linkages, e.g the Manage-

ment and Transition Framework (PAHL-WOSTL *et al.*, 2010). A comprehensive overview of frameworks and their scope of application is provided in BINDER *et al.* (2013).

2.4.2 N-tier Variables and Action Situations

The foundations of the SES framework are four core variables (i.e., the first-tier variables) reflecting the ecological and social dimension of the SES at the broadest level, namely the resource system (RS), resource unit (RU), governance system (GS) and actors (A). The resource system is defined as ecological, and/or other, e.g. technical, processes, that generate or sustain a stock of resource units. The stock of RU referred to in the SES context is generally classified as common-pool resource, as through the nature of this resources collective action problems arise (see Section 2.1.2). The actors' pursuit of appropriating RU from the stock imposes governance challenges on the SES, which are addressed through the institutional arrangement defined in the governance system (HINKEL *et al.*, 2015). These four first-tier variables "jointly affect and are indirectly affected by interactions and resulting outcomes at a particular time and place" (OSTROM, 2007a, p. 15182), through which they form an action situation. The notion of action situations, where interactions (I, e.g. harvesting, networking or self-organization activities) and outcomes (O) are located, is derived from the IAD framework where action situations are the arena in which individuals or organizations act, affect and evaluate outcomes produced by actions while bound to social and biophysical constraints (MCGINNIS AND OSTROM, 2014).

For each actor's particular position, a set of possible actions can be assigned. In order to chose among the available options of action, actors need to have sufficient information to be aware of the consequences of their action, the expected outcome and the costs that are associated with the action. For example, a licensed fishermen who decides to use a small-meshed net likes to obtain additional profits, but only choses this option because he/she knows the the costs in case of being caught by the inspectors are smaller than the expected benefits. The internal structure of the action situation that was initially outlined in the IAD framework is illustrated in Figure 2.4.

The structure of an action situation as composed of first-tier variables, interactions and outcomes is illustrated in Figure 2.5. In the SES framework, broader spatial implications that arise due to the overall social, economic, and political settings (S), which mutually affect and are affected by the action situation, are included as first-tier variable. In a similar way, related ecosystems (ECO) are part of the complex picture, for example the pollution of a river causes damage in adjacent terrestrial ecosystems (ECO3 – pollution patterns) and represented as first-tier variable in the SES framework. Variables at the highest-tier (RS, RU, GS, A, S, ECO) can be decomposed into second-, third- or lower-level tiers, forming the nested structure of the framework. These lower-tier variables account for the dynamic nature of SES and the

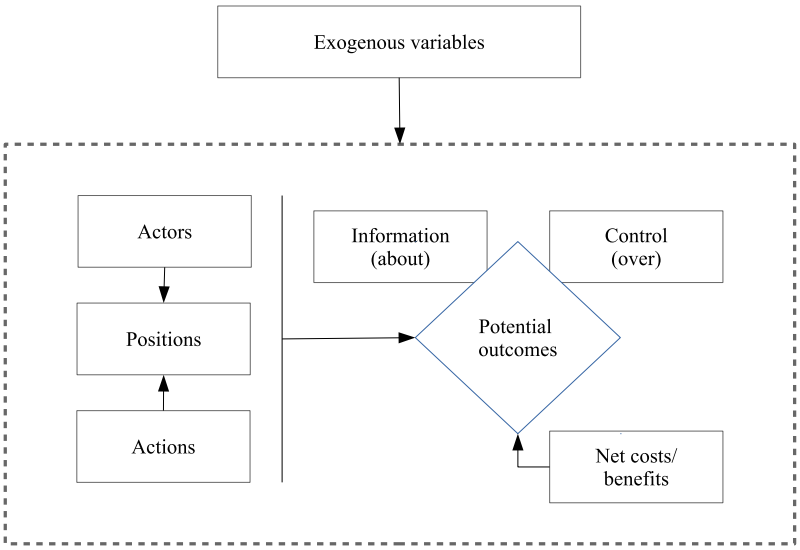

Figure 2.4 – Internal structure of an action situation as developed in the IAD Framework (OSTROM, 2011; ANDERIES AND JANSSEN, 2013).

feedbacks that emerge through interactions and processes (HINKEL *et al.*, 2014). For example, the first-tier variables resource units (RU) and actors (A) consist of the second-tier variables economic value of RU (RU4) and the actor's economic dependency on the resource units (A8), which through the interaction of harvesting (I1) result in macro-level outcomes related to the social and ecological sustainability of the SES (see Annex A for an overview of variables). In this regard, the framework "tries to do justice to the complexity of real world phenomen[a] and adopts a less reductionist view" (SCHLÜTER AND MADRIGAL, 2012, p. 164) of the processes taking place. Moreover, OSTROM AND COX (2010) stressed the need to account for the linkage of different action situations: the outcomes of one action situation might be directly or indirectly linked to other action situations, e.g. the outcomes generated through interactions at a constitutional rule level alter the options available for actors at the operational level (ANDERIES AND JANSSEN, 2013), e.g. through input regulations for fisheries.

Besides the macro-level outcomes at the SES scale, interactions among lower-tier variables of each of the first-tier variables lead to micro-level outcomes for both the social and the ecological system. These outcomes are linked through feedbacks and interactions which again impact the respective micro- and macro-level outcomes (see HINKEL *et al.*, 2014; OSTROM AND COX, 2010).

With regard to sustainability problems that are the focal vantage point of each SES analysis, the specific intended as well as unintended outcomes derived through the interplay of variables need to be assessed. For this purpose, MCGINNIS AND OSTROM (2014) provided

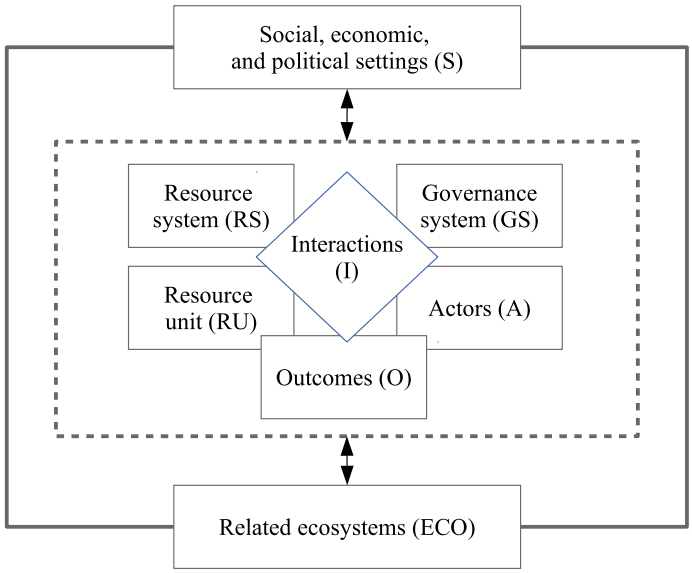

Figure 2.5 – Structure of an action situation within the SES framework, adapted from OSTROM AND COX (2010).

measures for the ecological and social performance: at the ecosystem scale, overexploitation, resilience, sustainability and biodiversity might serve as measures for the assessment of outcomes, whereas (economic) efficiency (costs relative to benefits), equity of how the costs and benefits are distributed among participants, accountability and sustainability (the long-term consequences of decisions and the evolution of outcomes over time) are attributed to the social sphere. Besides this range of possible measurements, various studies also describe the overall outcomes for the SES. Hereof, special attention should be directed towards the mentioned social outcomes, e.g. livelihood and compliance outcomes (CINNER AND HUCHERY, 2014), the conformance of institutions with the values of local actors (IMPERIAL AND YANDLE, 2005), and the likelihood of self-organization (HINKEL *et al.*, 2015), as well as towards a variety of negative social outcomes like social inequalities and illegal behavior (KITTINGER *et al.*, 2013). Within some studies, no further differentiation of measures and outcomes is provided, as for example found in KITTINGER *et al.* (2013). They describe the lack of public accountability[11] and inequitable benefit allocation as negative social outcome of co-management arrangements, whereas in contrast accountability and equity are defined as measures in MCGINNIS AND OSTROM (2014).

[11] Following LEBEL *et al.* (2006), accountability describes "whether authorities are obliged to provide information and explain decisions and actions or inactions and whether they can be sanctioned when those answers are unsatisfactory".

The work on SES increasingly reveals variables at second and lower-tier levels relevant for understanding sustainability problems. The most recent update of the general framework, published by MCGINNIS AND OSTROM in 2014, contains a set of 56 second-tier variables. But to identify "reasons for sustainable or unsustainable outcomes" (OSTROM, 2007a, p. 15183), the challenge lies in the selection of a specific set of variables at all tiers and depict the particular horizontal and vertical linkages among them. The reduction of the number of studied variables is both feasible and necessary, since through the selection of second-tier variables only the associated relevant lower n-tier variables need to be taken into account (OSTROM, 2007b). At the same time, this process is equally demanding, as variables are linked through non-linear relations and feedbacks and influence each other in various dimensions. However, the subsequent choice of potentially relevant components according to the underlying theoretical assumptions, supports the openness of the framework for different theoretical, conceptual and methodological attempts. The process of variable selection can be approached from two sides, either a diagnostic or theory driven procedure. In their work on turtle egg extraction in a community in Costa Rica, SCHLÜTER AND MADRIGAL (2012) provided insightful experiences with the application of the framework from a combined and theory guided vantage point. In respect to the diagnostic procedure, HINKEL *et al.* (2015) presented a step-by-step guideline to the analysis of sustainability problems in SES, taking RS and RU as foundation for the setting of the action situation (see Table A.2, Annex A, for the detailed procedure). Whereas the analysis of variables through the diagnostic procedure enables the generation of theory across cases, the selection of variables for an explanatory analysis in practice is often driven by inductive considerations, as THIEL *et al.* (2015) pointed out in their evaluation of the application of the framework. Shortcomings across cases are found especially in terms of construct validity (referring to the difficulty of defining ways to measure variables when secondary data is used) and external validity, which becomes particularly challenging when general conclusions should be derived from individual case studies (THIEL *et al.*, 2015; SCHLÜTER AND MADRIGAL, 2012). Nevertheless, ongoing refinements constantly improve the applicability of the framework and propose promising adaptations for further operationalization (e.g. in LESLIE *et al.*, 2015a; DELGADO-SERRANO AND RAMOS, 2015; NAGENDRA AND OSTROM, 2014).

2.4.3 Social Capital within the SES Framework

Given the compiled theoretical background outlined above, the connection between the concept of social capital and the framework for studying social-ecological systems finally needs to be established. The decisive point that links both elements is the potential for collective action in the management of natural resources. Following the elaborated argumentation of AHN AND OSTROM (2002), the aggregation of trust, networks and institutions into the social capital

concept can increase the understanding of cooperation among actors to solve social dilemmas (see also e.g. BOWLES AND GINTIS, 2002; PRETTY AND WARD, 2001). RUDD (2000) asked, whether it is possible to generate norms of environmental stewardship through the enhancement of certain social processes and interactions, namely the development of shared social visions, facilitating cooperation among actors networked in trust relationships. For fishery as being an indicative example of possible common-pool resource problems and tightly linked human-nature relations, GRAFTON (2005) was able to show the link between successful fisheries governance and collective action through enhanced trust and cooperation. Hence, the field of research on social capital corresponds to the field of application of OSTROM's SES framework, which provides a conceptual tool for the analysis of these very social dilemmas and eventually facilitates the elaboration of pathways to their solution, acknowledging the complexity of interactions among the social and the ecological system (OSTROM, 2011).
Though the debate about the usefulness of the social capital concept is still on-going, as it is discussed by DURLAUF (1999) and critically reflected in AHN AND OSTROM (2002), recent updates of the SES framework already incorporate at least parts of the concept as second-tier variable A6 – norms (trust/reciprocity) and social capital (MCGINNIS AND OSTROM, 2014), thus admitting its contribution to the sustainability of SES. An assessment of the representation of social capital within the framework supports this finding. Besides norms of trust and reciprocity, which are treated equally to social capital in the updated framework, the proposed list of second-tier variables as found in MCGINNIS AND OSTROM (2014), covers the elements of institutions (GS6 – rules-in-use) and networks (GS9 – network structure). Further, variables referring to path dependence of the management regime and context specificity, like historical continuity (GS10) and the actor's history or past experience (A3), are valuable in regard to social capital (MURRAY, 2008; PRETTY AND WARD, 2001). The understanding of networks is enhanced through information on the number of relevant actors (A1) and their correspondent prevailing mental models (A7) – a set of variables for which the outcomes depend on the configuration of interactions, e.g. the processes and feedbacks of information sharing, learning, deliberation and networking activities (cf. BIGGS *et al.*, 2011). Despite the apparent recognition of the relevance of social capital in the SES context, pertinent studies on its analysis in such a frame and a clear perception on its position are largely missing, though the benefits for analysis are shown in NAGENDRA AND OSTROM (2014) for urban lake commons, and to some extent in BARNETT AND EAKIN (2015) on household vulnerability. Identifying gaps and possible improvements of the framework tailored to the analysis of social capital, however, has gained little attention.

3 Methodological Approach

3.1 Case Study Design and Preliminary Study

The generation of particular knowledge about the social side of the SES Lake Shkodra facilitates the enhancement of future sustainable development. For this purpose, case-study research was revealed as the most appropriate means. As POTEETE *et al.* (2010) emphasized, the ability of case study research is to illuminate certain details of the particular case and to enhance context-specific knowledge.

According to HANCOCK AND ALGOZZINE (2006), a case study approach allows "in-depth understanding of situations and meaning for those involved" (HANCOCK AND ALGOZZINE, 2006, P. 11) and is, therefore, suitable for studying social capital in the context of fishery and nature conservation at Lake Shkodra. Moreover, "[...] the micro-level approach to social capital overcomes the methodological problems associated with its measurement [...]. Therefore in-depth case studies of networks of interaction are appropriate" (MURRAY, 2008, p. 4). To allow for a structured and multi-level analysis of social capital within the case study, an adapted SES framework (see Chapter 3.2 and Table3.2) was used. Thereby, not only linkages among variables of the social side of the system were identified, but also interrelations with the environmental system and possible feedbacks between the coupled systems were acknowledged. Data needs for the application of the framework were addressed with a qualitative approach, which is consistent with other studies relying on the SES framework (an overview is given by THIEL *et al.*, 2015). The study follows the understanding of AHN AND OSTROM (2002), where institutions, networks, trust and trustworthiness are at the basis of the concept of social capital. Moreover, AHN AND OSTROM (2002) directly refer to the importance of past experiences through "values and relationships created by individuals in the past that can be drawn on in the present and future" (p. 3). The importance of past experiences for overcoming social dilemmas related to the commons, as e.g. stressed in case studies of PINKERTON AND WEINSTEIN (1995), was particularly interesting in the context of Albania's transition from communism to market democracy.

To test for the approach outlined above, a preliminary study at Lake Shkodra was conducted in June 2015, which involved a primary assessment of the current status of the lake as perceived by local stakeholders. This preliminary study consolidated the research focus and tested the validity of the interview guideline. The confirmation of the preliminary interview guideline helped to identify problems of understanding and difficulties in the translation process. The results of the preliminary study singled out the explanatory power of the concept of social capital for Lake Shkodra.

3.2 SES Framework Adaptation and Application

Through the use of the SES framework, the assessment of interactions among the ecological and the social sphere as well as the integration of a great variety of data types for the particular research focus is facilitated (DELGADO-SERRANO AND RAMOS, 2015). The adaptability of the framework to specific case studies increases the understanding of common-pool resource dilemmas and allows the identification of potential solutions through unraveling the complex structure of multi-level SES governance. In order to operationalize the SES framework for the Albanian case study, the diagnostic procedure proposed by HINKEL *et al.*, 2015 was applied (see Table A.2, Annex). The diagnosis followed the main research questions "What are the social outcomes of fishing activities at Lake Shkodra?" and "What is the role of social capital in the formation of these outcomes?". In a first step, the focal action situation within which the variables interact and lead to outcomes was identified. Due to the subtractability of the targeted resource units (commercial fish species) an appropriation action situation (activities subtract from a stock of resource units) was identified as focal action situation in the diagnostic procedure.[12] Within the action situation, relevant second-tier and respective lower-tier variables were unpacked in a next step of the diagnostic approach (cf. COX, 2014). Decisions about the inclusion of variables within the framework were guided by collective action theory, common-pool resource theory, and the concept of social capital. Further support is provided through the strength of evidence of empirical data from studies with a similar focus, e.g. HOLLAND (1998); SEKHAR (2007); BARNETT AND EAKIN (2015). The adaptation of the framework for particular variables related to social capital was guided by the proposed treatment of HINKEL *et al.* (2014). The adapted framework is presented in Table 3.2 (cf. the original framework in Table A, Annex A).

- ▷ The variable "Networks" was shifted from governance system (GS) to actors (A6) as third-tier variable of social capital (A6). The differentiation of bonding, bridging and linking ties as part of the network structure was used in line with the social capital concept. Networks as part of the variable A6 was consistent with the aim of the study and the formalization procedure in HINKEL *et al.* (2014).

- ▷ The aspects of social capital were represented at the actor level (A6) through the third-tier variables trust and reciprocity/trustworthiness (A6.1) and networks (A6.2) as well as rules-in-use (GS6) as second-tier variable under the Governance System (GS).

- ▷ The second tier variable leadership was renamed into key actors (A5) to not only account for individuals with leading skills, but actors with the ability to influence others in either

[12] GARDNER *et al.* (1990) emphasize the connection of appropriation and provision situations for natural resource management. The behavioral change in appropriation activities, needed to avoid overexploitation of fishery, is identified as (demand-side) provision problem resulting from the appropriation of resource units.

positive or negative directions. Key actors might be trustworthy, powerful individuals "followed by their peers" (BASURTO *et al.*, 2013b, p. 1378) and in case they exist, likely to increase the chance of collected action; otherwise key actors might also decrease their positive influence through power relations (related to trust, networks, corruption, participation etc., cf. SCHMIDT AND THEESFELD, 2012 on elite capture).

- ▷ The second-tier variable history/past experience (A3) involved personal and shared experiences from socialist times. Implications of the post-socialist context were furthermore attributed to the variable historical continuity (GS10, changes within governance system over time; MCGINNIS AND OSTROM, 2014) of the governance system GS and additionally reflected in the wider social, economic and political settings (S) through the variable political stability (S3).

- ▷ Instead of two third-tier variables as in LESLIE *et al.* (2015a), number and diversity of relevant actors (A1) were merged to one variable. The variable represents the aggregated level of the socioeconomic attributes of single actors (A2). The diversity of actors reflects the heterogeneity and size of the group of stakeholders and covers important attributes associated with the likelihood of collective action (AGRAWAL AND GIBSON, 1999; COX *et al.*, 2010).

For each variable included in the adapted SES framework in Table 3.2, a working definition is provided. Respective references as well as the formulation of key arguments demonstrating the significance of the selected variables for the case study at hand allowed for the internal validity along with external validity in the case of re-positioned variables (THIEL *et al.*, 2015). This procedure ensured the viable use of the SES framework through a focus on relevant and appropriate variables (cf. THIEL *et al.*, 2015), while at the same time outcomes of the interaction among variables were interpreted context-specific and therefore obtained a higher integrity. Interactions that linked different variables of the framework and shaped the micro-level outcomes depended on the actions allowed within the appropriation action situation, hence the choices of action that actors were able to make. For the analysis, the ten interactions defined in OSTROM (2007a) were taken into account. These are: harvesting (I1), information sharing (I2), deliberation processes (I3), conflicts (I4), investment activities (I5), lobbying activities (I6), self-organization activities (I7), networking activities (I8), monitoring activities (I9), and evaluative activities (I10). Besides interactions among variables within the same action situation, the linkage of a range of action situations within one SES was acknowledged. For example, Albania's status in the EU accession process and the necessary harmonization of legislations shapes the constitutional-choice action situation, which in turn advances regulations concerning fishery and nature conservation with implications for the operational rule action situation at the local level.

With regard to the operationalization of the framework for the analysis of social capital at Lake Shkodra, the distinction of three micro-level outcomes of the appropriation action situation was the starting point for the application of the SES framework. The identified micro-level outcomes are: (reported) rule compliance with fishery regulations, the likelihood of self-organization for the appropriation of resources, namely commercial fish species, and the configuration of social fit with relation to fisheries. These micro-level outcomes are intermediaries which through feedbacks and interactions with other action situations shape the macro-level outcome of sustainability at the SES scale. In a backward reasoning approach (SCHLÜTER *et al.*, 2014) the research question guided the assessment of relevant interacting variables and feedbacks that shape the micro-level outcomes. Externalities arising through interactions at either micro- or macro-level can feed back on other levels within an action situation and across linked action situations with respective outcomes both at micro- and macro-scale. Through the analysis of their respective feedbacks and cross-scale linkages, the role of relevant variables and interactions related to social capital in shaping the micro-level outcomes at Lake Shkodra was assessed with the help of the case-specific SES framework. Table 3.2 provides an exemplary overview of the micro-level outcomes for the appropriation action situation at Lake Shkodra, associated interactions and second-tier variables. These are further elaborated in Chapter 5.

Table 3.1 – First-, second-, and third-tier variables of the adapted SES framework with according working definitions. The theoretic link to the concept of social capital is indicated as well as the data source for the analysis.

Variables	Working definition	Reference	Theoretic linkage	Means of analysis
Social, Ecologic, and Political Setting (S)				
S1 – Economic development			Relates to structural and cognitive dimension of social capital.	Literature review/documents
S3 –Political stability			Political stability influences ability of capacity building, definition of responsibilities of authorities, competencies of political actors, etc.	Literature review/documents
Resource System (RS)				
RS2 – Clarity of system boundaries	Biophysical characteristics that make it feasible for actors to determine where the resource system starts or ends.	BASURTO *et al.* (2013b)	Importance for collective action as defined in Ostrom's design principles for collective action, see COX *et al.* (2010).	Interviews
RS3 – Size of resource system	Absolute or relative descriptions of the spatial extent of the resource system.	LESLIE *et al.* (2015a)	Importance for collective action as defined in Ostrom's design principles for collective action, see COX *et al.* (2010) as well as for the scale dimension of social fit (EPSTEIN *et al.*, 2015).	Documents/interviews
RS5 – Productivity of system	Rate of generation of units of biomass determined by production-consumption rates per unit of time, surface, or volume.	BASURTO *et al.* (2013b)	Knowledge of the resource system influences likelihood for self-organization, outlined in OSTROM (2009) and appropriateness of regulations.	Literature review/documents
RS5.1 – Stock status	Rate of generation of units of biomass as determined by production in a given year.	BASURTO *et al.* (2013b)	Knowledge of the resource system influences likelihood for self-organization, outlined in OSTROM (2009) and appropriateness of regulations.	

Variables	Working definition	Reference	Theoretic linkage	Means of analysis
RS5.2 – Biophysical factors	Upwelling, biogeographic or geomorphological factors affecting the generation of units of biomass.	BASURTO *et al.* (2013b)	Knowledge of the resource system influences likelihood for self-organization, outlined in OSTROM (2009).	
RS7 – Predictability of system dynamics	Degree to which actors are able to forecast or identify patterns in environmentally driven variability on recruitment.	BASURTO *et al.* (2013b), LESLIE *et al.* (2015a)	Knowledge of the resource system influences likelihood for self-organization, outlined in OSTROM (2009).	Literature review/documents
Resource Unit (RU)				
RU1 – Resource Unit mobility	Slow or fast moving commercial fish species; costs of observing and managing a system depend on mobility of resource unit.	OSTROM (2009)	Importance for common-pool resource management and self-organization capacities (OSTROM, 2009).	Literature review/documents
RU5 – Number of units	Number of commercial fish species harvested or that could be potentially harvested.	BASURTO *et al.* (2013b)	Perceived scarcity of resource influences likelihood of self-organization, link to social capital (OSTROM, 2009).	Literature review/documents
RU7 – Spatial and temporal distribution	Allocation patterns of commercial fish species across a geographic area in a particular time period, e.g. migratory species.	BASURTO *et al.* (2013b)	Influences bonding and bridging ties as part of social capital among resource harvesters and relates to institutional arrangements (e.g. for migratory fish species).	Literature review/documents
Governance System (GS)				
GS1 – Policy Area	Rule systems tailored for a particular area of knowledge, geography, or time.	BASURTO *et al.* (2013b)	Relates to structural dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002).*	Documents
GS1.1 – Fishery	Rule systems tailored to managing and governing lake fishery.	cf. BASURTO *et al.* (2013b)	Relates to structural dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002).*	Documents

Variables	Working definition	Reference	Theoretic linkage	Means of analysis
GS1.2 – Environment	Rule systems tailored to managing and governing human and biophysical interactions usually around common-pool resources.	cf. BASURTO *et al.* (2013b)	Relates to structural dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002).*	Documents
GS4 – Regime type/management strategy	Specifying the overall logic upon which the overarching governance system is organized.	MCGINNIS AND OSTROM (2014)	Existing formal regime type compared with actual conditions in the field, related to institutional fit; institutions as part of social capital.	Documents/interviews/ literature review
GS5 – Rule-making Organizations	Types of institutions recognized by external actors and/or authorities that facilitate formal structured interactions among actors affected by these institutions.	MCGINNIS AND OSTROM (2014)	Relates to structural dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002).*	Documents/interviews
GS5.1 – Government organizations	Institutions with governmental authority mandated to protect the public trust.	BASURTO *et al.* (2013b)	Relates to structural dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002).*	Documents/interviews
GS5.1.1 – National *GS5.1.2 – Regional* *GS5.1.3 – Local*			Relates to structural dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002).*	Documents/interviews
GS5.2 – Non-government organizations	Institutions without governmental authority mandated to protect the public trust.	BASURTO *et al.* (2013b)	Relates to structural dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002).*	Documents/interviews
GS5.2.1 – National *GS5.2.2 – Regional* *GS5.2.3 – Local*			Relates to structural dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002).*	Documents/interviews
GS5.3 – Community-based organizations	Local organizations, where the community takes over (some) management responsibilities.	WIBER *et al.* (2004)	Groups formed for collective management of targeted resources involve social capital.	Documents/interviews

Variables	Working definition	Reference	Theoretic linkage	Means of analysis
GS5.4 – Hybrid organizations	Organizations that combine public, private, and voluntary organizations.	MCGINNIS AND OSTROM (2014)	Relates to structural dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002).*	Documents/interviews
GS6 – Rules-in-use	Human-constructed constraints or opportunities within which individual choices take place and which shape the consequences of their choices.	MCGINNIS (2011)	Relates to structural dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002).*	Documents/interviews
GS6.1 – Operational rules	Implementation of practical decisions by individuals authorized (or allowed) to take these actions.	MCGINNIS (2011)	Relates to structural dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002).*	Documents/interviews
GS6.2 – Collective choice rules	The processes through which institutions are constructed and policy decisions made, by those actors authorized to participate in the collective decisions as a consequence of constitutional choice processes, according to the procedures as established by constitutional choice processes.	MCGINNIS (2011)	Importance for collective action as defined in Ostrom's design principles for collective action, see COX *et al.* (2010) and related to structural dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002).*	Documents/interviews
GS6.3 – Constitutional rules	The processes through which collective choice procedures are defined and legitimized.	MCGINNIS (2011)	Relates to structural dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002).*	Documents/interviews
GS7 – Property rights system	Specifying the relations among people in relation to things, as well as duties and obligations.	MCGINNIS AND OSTROM (2014)	Secured (future) property rights enable long-term perspectives and increase incentives – with implications for likelihood of self-organization – beneficial for sustainable resource use (GREGORIO *et al.*, 2008).	Documents/interviews

Variables	Working definition	Reference	Theoretic linkage	Means of analysis
GS8 – Repertoire of norms and strategies	Human behavior shaped by beliefs, perceptions, and the biophysical setting; it governs social interactions, but it is distinguished from rules in that there is no formal sanctioning in place.	BASURTO *et al.* (2013b)	Relates to structural dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002)* and related to cognitive dimension of social capital (shared attitudes/norms, trust, trustworthiness and reciprocity).	Interviews
GS10 – Historical continuity	Temporal aspect of systems of governance, which allows the distinction between static and adaptive/more flexible systems.	MCGINNIS AND OSTROM (2014)	Post-socialist context reflected in governance structures for natural resources, institutional transition from central planning to EU regulations aimed at devolution (KLUVÁNKOVÁ-ORAVSKÁ *et al.*, 2009).	Documents/interviews
Actors (A)				
A1 – Number and diversity of relevant actors	Number and type of actors that are present within a particular social-ecological system and participate in or interfere with the harvest of the resource.	LESLIE *et al.* (2015b)	Importance for common-pool resource management and self-organization capacities (OSTROM, 2009).	Documents/interviews
A2 – Socioeconomic attributes	Characteristics of actors related to social and economic dimensions affecting fishing dynamics.	BASURTO *et al.* (2013b)	Importance for common-pool resource management and self-organization capacities (OSTROM, 2009).	Interviews
A3 – History or past experience	Past interactions that affect current actor's behavior and fisheries dynamics.	BASURTO *et al.* (2013b)	Relates to cognitive dimension of social capital (shared attitudes/norms, trust, trustworthiness and reciprocity), see KRISHNA AND SHRADER (2002).	Interviews

Variables	Working definition	Reference	Theoretic linkage	Means of analysis
A5 – Key actors	Actors who have skills and power to facilitate or hamper collective action or collaboration, and are potentially followed by their peers.	cf. BASURTO *et al.* (2013b); CÁRCAMO *et al.* (2014)	Importance for common-pool resource management and self-organization capacities (OSTROM, 2009) and related to structural dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002)*. Also related to cognitive dimension of social capital (shared attitudes/norms, trust, trustworthiness and reciprocity).	Interviews
A6 – Social capital	Social capital is an attribute of individuals and of their relationships that enhances their ability to solve collective-action problems and involves trust/trustworthiness, networks and formal/informal rules and institutions.	OSTROM (2007b)	Importance for common-pool resource management and self-organization capacities (OSTROM, 2009) and related to structural dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002)*. Also related to cognitive dimension of social capital (shared attitudes/norms, trust, trustworthiness and reciprocity).	Interviews
A6.1 – Trust and reciprocity/trustworthiness	Trust is a measure of the extent to which members of a community feel confident that other members will live up to their agreements even if doing so may not be in their immediate interest. Reciprocity is a symmetrical response to a previous cooperative or defective action by a member of the community. Trustworthiness is a proxy for the level of trust.	BASURTO *et al.* (2013b)	Relates to cognitive dimension of social capital (shared attitudes/norms, trust, trustworthiness and reciprocity), see KRISHNA AND SHRADER (2002).	Interviews

Variables	Working definition	Reference	Theoretic linkage	Means of analysis
A6.2 – Networks	The patterns of relationships between individuals and groups.	BARNES-MAUTHE *et al.* (2014)	Importance for common-pool resource management and self-organization capacities (OSTROM, 2009), relates to structural dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002).*	Interviews
A6.2.1 – Bonding	Ties within cohesive subgroups, e.g. within one community.	BODIN AND CRONA (2009)	Relates to structural dimension of social capital (further network characteristics), as well as to cognitive dimension (shared attitudes/norms, trust, trustworthiness and reciprocity) (KRISHNA AND SHRADER, 2002), shaped through shared experiences, e.g. communist regime. Cohesiveness of bonds influences in- and out-group understanding, information sharing activities etc.	Interviews
A6.2.2 – Bridging	Ties that span between otherwise disconnected sets of actors, e.g. between communities at the eastern and western shore of Lake Shkodra.	BODIN AND CRONA (2009)	Relates to structural dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002).*	Interviews
A6.2.3 – Linking	Particular kind of bridging ties, which vertically connect different hierarchical levels of authority, e.g. representatives of fishermen that connect the FMO and individual fishermen and fishing communities.	BODIN AND CRONA (2009)	Relates to structural dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002).*	Interviews

Variables	Working definition	Reference	Theoretic linkage	Means of analysis
A7 – Knowledge of SES/mental models	Subjective knowledge about aspects of the systems and outcomes related to perceptions of how the SES functions influenced through cultural and environmental factors and past experiences.	BIGGS *et al.* (2011); HUNT *et al.* (2013)	Importance for common-pool resource management and self-organization capacities (OSTROM, 2009), relates to structural and cognitive dimension of social capital (networks and institutions), see e.g. KRISHNA AND SHRADER *(2002)* and is influenced through post-socialist context.	Interviews
A8 – Dependency on the resource	Actors are dependent on the resource for a major portion of their livelihood.	BASURTO AND OSTROM (2009)	Importance for common-pool resource management and self-organization capacities (OSTROM, 2009).	Interviews
A8.1 – Economic dependence	The resource constitutes a source of monetary income and plays a major role in fisher's ability to sustain their livelihoods.	BASURTO *et al.* (2013b)	Economic dependence related to cognitive social capital (e.g. trust), and structural dimension through networks, established through shared attitudes and the enforcement of institutions (HATCHER *et al.*, 2000; KARPER AND LOPES, 2014).	Interviews
A8.2 – Cultural dependence	The resource constitutes a source of cultural values, practices, and services, and plays a major role in the fishers' ability to sustain their livelihoods.	BASURTO *et al.* (2013b)	Cultural dependence related to cognitive and structural social capital, traditions in the use of resources, e.g. through self-organization (HOLLAND, 1998).	Interviews

Table 3.2 – Outcomes, interactions and variables within the appropriation action situation at Lake Shkodra. The nomenclature of interactions and variables is in line with the SES framework.

Micro-level social outcomes	**Interactions**	**Associated variables**	**Illustrative example**
Compliance (CINNER AND HUCHERY, 2014; POLLNAC *et al.*, 2010)	I1, I2, I8, I9	S1, S3, GS4, GS6, GS10, A3, A6, A7, A8, RU5, RS5, RS7	Weak bonding ties among fishermen (A6) hindered the enforcement of social monitoring mechanisms (GS6), which were also reduced through the experience of bribing as consequence of networking activities (I8), unequal information sharing (I2) and the perception of insufficient state control compared to former times (GS10, A8).
Likelihood of self-organization (HINKEL *et al.*, 2015)	I1, I2, I7, I8, I9	GS6, GS8, GS10, A1, A3, A6, A7, A8, RU5, RU7, RS5, RS7	In general fishing activities (I1) were carried out individually. Networking activities (I8) were only present in Zogaj, where the ability of self-organizing (I7, A6) enabled temporary cooperation, facilitated e.g. by the actors' high dependence on resource (A8).
Social fit (DECARO AND STOKES, 2013; EPSTEIN *et al.*, 2015)	I1, I3, I9, I10	GS4, GS6, GS8, A5, A6, RU5, RS5, RS7	Strong bonding ties (network closure), but less bridging (brokerage) and especially a lack of linking ties (A6) hampered the transmission of knowledge (A8, I2) informing an adapted co-management regime (GS4, GS6).

3.3 Data Collection

3.3.1 Literature and Document Review

An extensive review of scientific literature was conducted in the beginning of the study. Additionally, a review of relevant policy documents and project reports with a focus on Lake Shkodra facilitated the elaboration of the wider historical and political frame of Albania, e.g. through information from newspaper articles. These initial information formed the baseline for the subsequent stakeholder identification and data collection means. Information were gathered from governmental publications mainly on laws and regulations, project reports from international organizations and NGOs (9 documents), plans concerning fishery and/or nature conservation (e.g. Strategic Action Plans, Fishery Development Plan, Management Plans; 5 documents), Lake Skadar-Shkodra Joint Database[13], e.g. minutes of meetings, newspaper articles and statistical data (FAO, Transparency International, Albanian Government).

3.3.2 Stakeholder Identification and Selection

For the assessment of social capital at Lake Shkodra a comprehensive study of stakeholders involved in nature conservation and fishery was undertaken. Stakeholders were defined as individuals, groups of people or organizations at Lake Shkodra, "i.e. who are affected (positively or negatively) by decisions [...], or who can affect these decisions" (SUŠKEVIČS *et al.*, 2013, p. 207) related to fishery and/or nature conservation. With this definition, which is based on the widely used definition in FREEMAN (2010), different groups of stakeholders were distinguished either by their profession or their position towards nature conservation and/or fishery. Document analysis (e.g. ROYAL HASKONING, 2006) and media screening (e.g. newspaper articles, TV shows, etc.) revealed important actors and corresponding actor groups. Stakeholders were assigned to the scale on which they perform on the local, regional or national level and further distinguished according to their affiliation to community-based organizations (e.g. FMO), NGOs, or public sector organizations (e.g. national government). The results of this stakeholder identification and grouping are presented in Table 3.3.
In addition, a focus was put on the main fishing communities identified in BEKTESHI *et al.* (2013, p. 19). Interview visits were chosen in order to obtain the most representative sample of interviewees, according to the number of fishermen in the particular village or community and the respective importance of fishery for the community.

[13] Developed in the frame of the project Lake Skadar-Shkodra Integrated Ecosystem Management Project. Online http://lss2.iwlearn.org/ (last access April 20, 2016).

3.3.3 Qualitative Interviews

Qualitative data collection took place in August and September 2015 during a seven weeks field work period. In total, 36 formal interviews were conducted with the stakeholders identified in Table 3.3. Of these, 30 interviews were recorded and lasted between 15 and 110 minutes, six interviews were minuted. The interviews were conducted in English (10) and German (1), as well as with the help of an interpreter for German-Albanian (25). By reassessing the translated interviews via records, bias or left-outs in the translation were eliminated. Fishermen from the main fishing communities Shirokë, Zogaj, Grile, Shtoj i Vjetër, Stërbeq and Kamice (cf. BEKTESHI *et al.*, 2013) or fishing close to these areas were approached randomly in the field and interviewed in an informal setting to provide the most confidential environment. Additionally, four interviews with fishermen were conducted by snowball sampling thanks to recommendations of other fishermen. Locations and the according number of interviews are presented in the map, Figure 3.1. Further, interviews with other stakeholders such as scientists, management board of the FMO, scientists, national/local NGOs, international organizations and governmental representatives were scheduled via e-mails or phone calls first. Table 3.3 provides an overview of the number of interviews conducted per stakeholder group and defines the acronyms used for further reference to stakeholders in the study at hand.

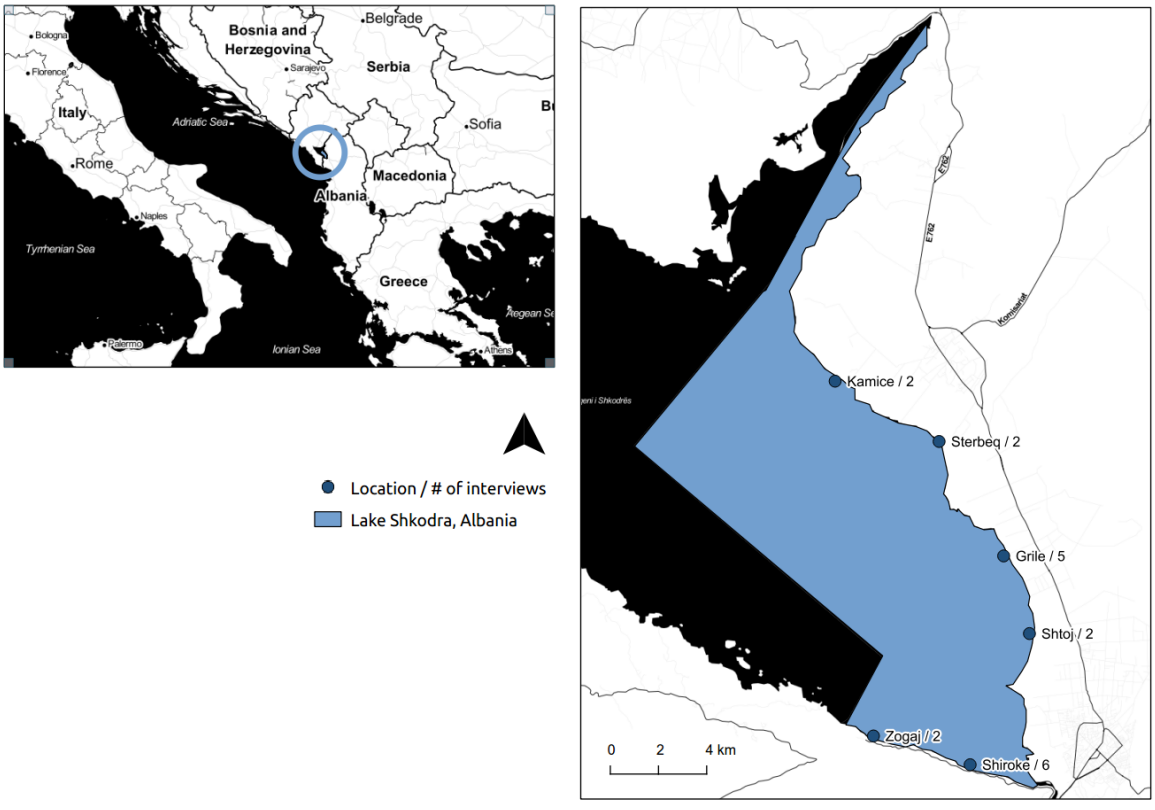

Figure 3.1 – Map of the case study region and the distribution of interviews in fishing communities at the Albanian side of Lake Shkodra.

Table 3.3 – The results of the stakeholder identification and grouping as well as the number of conducted formal interviews with different actors/actor groups are provided. The acronyms are used throughout the study.

Scale	Group	Type of stakeholder	# of interviews	Acronym
Local		Professional small-scale fishermen	17	fisher_1-17
		Recreational fishermen	1	rec_fisher
		Retailer	2	ret_1/2
		Scientists	3	sci_1-3
		Others (journalist)	1	journalist
	Community-based organization	Fishery Management Organization	2	FMO_1/2
Local/national		Guard	1	guard
Local/regional	Nongovernmental organization	Local NGO	2	locNGO_1/2
		National NGO	2	natNGO_1/2
National/local		International Organization	3	intOrg_1-3
	Public sector organization	National Government	2	natGov_1/2
		Total	36	

All interviews were semi-structured with open-ended questions to account for emerging topics and assure the highest level of openness of interviewees. Questions were aligned in a flexible guideline (the full interview guideline is provided in Annex B.1). Questions were chosen to gain information on specific variables of the adapted SES framework (indicated in Table 3.2) and particularly to improve the knowledge about aspects such as social relations in terms of networks and trust, past personal experiences, mental models, and perceptions about the management system, e.g. opportunities to participate. Acknowledging the general difficulty of assessing trust, the qualitative interviews enabled also the interpretation of indirect references towards relations of interpersonal trust. In general, questions for the assessment of interpersonal trust were based on considerations of KRISHNA AND SHRADER (2002), who suggested asking the interviewee about the trustworthiness of others (cf. also STORY *et al.*, 2015). Additionally, numerous informal talks with fishermen, residents, and staff of projects provided valuable information, supporting the validation of data obtained during interviews.

3.4 Data Analysis

In order to systematically analyze the empirical data, the structured approach of a qualitative content analysis was chosen, which was essentially developed by MAYRING (2000). According

to MAYRING (2000), categories as the basis of the analysis can be derived either inductively or deductively. The deductive approach (step 3 to 6, Figure 3.2) uses "prior formulated, theoretical derived aspects of analysis, bringing them in connection with the text" (MAYRING, 2000, p. 4). The use of the theory-driven analysis method allowed the incorporation of existing theory on collective action and the concept of social capital and was therefore chosen for the analysis of material for the case study at Lake Shkodra. The methodological approach combined the qualitative content analysis as means for the analysis of the empirical data and the use of the SES framework as guiding structure for the identification of related variables in the context of social capital and fisheries at Lake Shkodra.

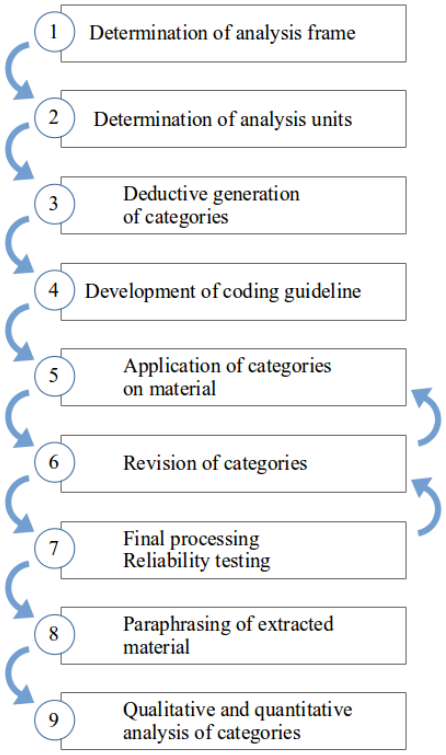

Figure 3.2 – Schematic procedure of the qualitative content analysis, following a deductive approach (MAYRING AND FENZL, 2014, p. 550).

Drawing on the variables included in the adapted SES framework, seven categories with 33 underlying first- and second level codes were developed. These covered lower-tier variables of the first-tier variables resource system (RS), resource units (RU), governance system (GS), actors (A), and the wider social, ecologic and political setting (S). The codes thus comprised all attributes of social capital represented by the first-tier variables actors and governance system (see Table B.2, Annex B.2). Of all codes, nine accounted for particular topics that emerged during interviews, e.g. related to corruption or future perspectives. Thus, the defined codes provided consistency in that they reflected the particularities of the interviews and the

Table 3.4 – Examples of codes in the category "Actor" as defined in the coding guideline, following MAYRING (2000).

1st level code	2nd level code	Definition	Example	Coding rule
Mental models (A7)		Mental models relate to subjective knowledge about aspects of the systems an outcomes related to perceptions of how the SES functions (BIGGS *et al.*, 2011 in HUNT *et al.*, 2013).	fisher_4: Er sagt, dass die Fischerei soll verboten, also die Behörden sollten das verbieten und dann kleinen Fisch reinwerfen, dann wird es wieder gut. (14)	
	Information sharing (INF)	Mechanisms to share information about the state of the social-ecological system (SCHLÜTER *et al.*, 2012; HUNT *et al.*, 2013).	fisher_11: F: Die von dem Staat sagen uns nichts, bezahlen für gar nichts, machen, was sie wollen. Die von hier treffen uns und sagen wir haben das oder das Problem, oder das ist passiert. (88)	Information about options on learning and information sharing regarding RS, RU, GS and A.
(Networks)	Bridging ties (A6.2.2)	Ties that span between otherwise disconnected sets of actors (BODIN AND CRONA, 2009).	natGov_1: Furthermore, they decided to destroy all agreements established between the Ministry, Fishery Directorate authority and Fishery Organization. (31)	Connection between actors of different group, e.g. fishermen and inspectorate or FMO, or among different NGOs.

theory-related dimension through the variables of the SES framework.

The main instrument for the qualitative content analysis is the coding guideline, which contains the basic elements of the analysis: the codes assigned to the respective categories, a definition for each code along with a prime example, and rules for the differentiation between codes (MAYRING AND FENZL, 2014). The assignment of codes to passages in the material strongly relied on the rules developed in the coding guideline and ensured the representation of relevant variables of the SES framework within the coding process. Table 3.4 exemplifies the applied coding guideline (full coding guideline in Table B.1, Annex B.2). The transcribed interviews as well as the minutes of informal, not recorded interviews, were coded with the software MAXQDA11, a qualitative data analysis software for Windows.

4 Social-Ecological System Lake Shkodra

4.1 Political, Historical and Economic Setting

In order to describe the current political and (socio-)economic setting of Albania in general and related to fishery and nature conservation at Lake Shkodra in particular, the wider historical development of the country needs to be taken into account. Albania is populated since Paleolithic times, mostly under the control of foreign forces (QIRIAZI AND SALA, 2000). In 1944, the communist regime of Albania was created under the guidance of Enver Hoxha, and initially strong connections to Yugoslavia, the Soviet Union and China were established. During his regime from 1944 to 1985, Enver Hoxha gradually cut foreign relations and increasingly isolated Albania from the West but also from other communist and socialist countries. This enforced political and economical autarky (cf. ECONOMIC COMMISSION FOR EUROPE, 2002, p. 4) was accompanied by "fear, paranoia and xenophobia" (LAWSON AND SALTMARSHE, 2000, p. 135), spread among the population. Collectivization and central planning were only insufficiently able to bring about economic development and food security for the growing population, and Albania became one of the poorest of the communist countries in southeastern Europe (PAPATHIMIU, 2012). However, the state-controlled central planning ensured meager, but minimum livelihood throughout the communist times (LAWSON AND SALTMARSHE, 2000). The totalitarian regime, which remained in power for 41 years, established an era of "isolation, economic deprivation and an imposed ideology" (LAWSON AND SALTMARSHE, 2000
ibid., p. 135), along with general espionage and the prosecution of dissidents.[14] After Hoxha's death in 1985, the ultimate collapse of the communist regime in 1991 was accompanied by widespread demonstrations of civil society, followed by a massive wave of emigration during which thousands of Albanians fled the country to search for better socioeconomic conditions (ECONOMIC COMMISSION FOR EUROPE, 2002) mainly in other European countries like Greece and Italy, and the United States. In the years following the collapse, the transition from a totalitarian state control towards a market economy was aspired, and the basis for a democratic republic was prepared. Though positive signals were received due to the "impressive record of recovery" (ECONOMIC COMMISSION FOR EUROPE, 2002, p. 7) in the years between 1992 to 1996, Albania was still plagued by low levels of trust in state authorities, a corrupt legal system, and a general lack of prospects due to high rates of unemployment (KAJSIU, 2010). The positive progress came to a halt in 1997, when the failure of the so-called pyramid invest-

[14] Worth mentioning in this regard is the special situation in northern Albania – an area characterized by mountainous terrain with difficult accessibility – where customary laws known as the *Kanun* exist since the 15th century and outlasted attempts of governments and religious leaders to diminish its influence. During instable times after the collapse of the communist regime, the *Kanun* reappeared in the remote parts of the northern Albanian alps, because of the absence of strong enforcement of state regulations (cf. RAMA AND THEESFELD, 2011).

ment scheme[15] destroyed savings of nearly two-thirds of Albanian citizens who participated in this get-rich-quick scheme since 1991 – losses equaling about half of the total Albanian GDP (cf. MÜLLER AND MUNROE, 2008). Initially peaceful protests with the demand for reimbursement were fueled by accuses about the involvement of the Albanian Democratic Party in the pyramid schemes, who had been giving way to the fraudulent investments without warning. Intensification of the anti-government protests and widespread arming resulted in violent turmoils, also described as "period of anarchy" (LAWSON AND SALTMARSHE, 2000, p. 141) with at least 1 500 dead and uncountable damage, e.g. through destruction of infrastructure, livestock, and the erosion of the fragile trust in the newly established governmental structures.[16] Besides intrastate consequences, the monetary loss caused severe economic damages to many families, who then were more than ever dependent on remittances from family members working abroad (MUSARAJ, 2011). Since the end of the violent turmoils, transition towards neoliberal market economy and a stable state made some progress, e.g. through international institutional and financial support. Despite advances in the anti-corruption legislation, Albania still faces one of the highest levels of corruption throughout the European countries, with a Corruption Perception Index of 36/100 in 2015 (TRANSPARENCY INTERNATIONAL, 2016).[17]

The fall of the socialist regime had not only altered the socio-economic reality, but also led to drastic and unsustainable exploitation of natural resources, exacerbated through the inability of the state to intervene. Illegal logging, hunting and fishing caused severe destruction of rare habitats (CULLAJ *et al.*, 2005). At the national level, environmental issues, which were brought on the agenda after 1992, were thrown back because of the crisis in 1997/98 and only reappeared at the very end of the century, supported by international entities like the United Nations Environment Programme (UNEP), the World Bank, EU, and various international organizations like the Food and Agriculture Organization (FAO) (ECONOMIC COMMISSION FOR EUROPE, 2002). As an official candidate country, a main priority for Albanian politics is currently the harmonization of the legal framework on environmental concerns with EU regulations (*acquis communautaire*) in order to fulfill the accession requirements. Barriers for the effective implementation of the regulations are seen in the lack of enforcement, lack of capacities (administrative and staff-related capacities) or the continued widespread corruption (EC, 2012). PRATO (2013) exemplified the occurrence of corruption in the Albanian society and demonstrated its persistence in daily life, particularly after the fall of the communist

[15] The function of pyramid investment schemes as explained in MUSARAJ (2011) relies on a recruiting system for new investors, where high returns for early participants result from payments of subsequent participants.

[16] International newspapers and news agencies started reporting about violent protests caused by the failure of the pyramid schemes in mid-January 1997; e.g. Agence France Presse, January 23, 1997 "Albanian police detain 50 in big 'pyramid' savings row"; The New York Times, January 26, 1997 "Pyramid-Fund Protests Turn Violent in Albania"; The New York Times, March 12, 1997 "Anarchy of Thugs Menaces Albania" etc.; last accessed through http://www.nexis.com/ March 20, 2016.

[17] Lower number indicates higher level of perceived corruption.

regime: besides "socially acceptable exchanges of favour" (PRATO, 2013, p. 200) among the public, corruption among representatives of the Albanian elite concerns e.g. the abuse of hierarchical power and the embezzlement of funds. In line with findings from PRATO (2013), interviewees stated that the most abundant form of corruption was found in payments to inspectors, police officers or other authorities in order to avoid sanctions.

To mitigate threats to biodiversity and negative impacts on important ecosystems, the Albanian government increased efforts to establish protected areas, yielding in a network of protected areas spanning 12.57 % of the total land area in 2009 (GHIURGHI, 2011). According to the IUCN (International Union for Conservation of Nature) classificatory system, Albania had 798 areas under protection of IUCN Category I to VI, and four Regional Nature Parks[18] in 2015 (AKZM, 2015). A more detailed itemization can be found in Table 4.1, which lists numbers and the respective areas for each IUCN protection category. In 2015, the newly established National Agency for Protected Areas (NAPA, or AKZM in Albanian) has begun its work to "improve the management of protected areas according to the requirements and international standards, [...] providing for both nature conservation and sustainable use of natural resources" (AKZM, 2015), providing a detailed strategy on mid- and long-term objectives.

Table 4.1 – Number and area (ha) of protected areas in Albania, according to IUCN categories (AKZM, 2015).

IUCN category	**# of PAs**	**Area (ha)**
Cat. I – Strict Nature Reserve/Scientific Reserves	2	4 800
Cat. II – National Parks	15	210 501
Cat. III – National Monuments	750	3 470
Cat. IV – Managed Nature Reserve/Natural Park	22	127 180
Cat. V – Protected Landscape	5	95 864
Cat. VI – Protected Area of Managed Natural Resources	4	18 245
Total	798	460 060

Fisheries at Lake Shkodra experienced major changes in the course of the described nationwide developments. More than 40 years of central state organization were substituted by "shock-strategy-like" measures, which came along with privatization and the end of employment in state enterprises (cf. KAJSIU, 2010). This also meant that the former regulatory mechanisms, e.g. on legitimate fishing gear and size-based regulations, as well as efficient access control to fishing grounds at the lake were suspended. In this vacuum, a massive increase in the number of fishermen took place, resulting in what resembled an open-access situation (SANDLUND, 2004; see SCHMIDT AND THEESFELD, 2012 on isochronous situation at Lake Ohrid, Albania).

[18] According to AKZM (English: National Agency for Protected Areas), Regional Nature Parks are defined as "Territories/Areas with natural values and important to the local communities that are under the management of local government, such as forests, grasslands, reservoirs, wetlands, etc." (AKZM, 2015).

Pressure on the system accelerated during the turmoils in 1997/98, while the high number of resource users and illegal practices like dynamite fishing or the use of electric generators impacted the species composition, since especially the stocks of high value fish species like Common carp (*Cyprinus carpio*) and bleak (*Alburnus albidus alborella*) were exploited (GRAZHDANI, 2014). The establishment of customary rules in form of the *Kanun* had been oppressed throughout most of the past century, resulting in small or no influence of these customary laws in the proximity of the cities, compared to the relevance in the more remote mountain areas.

After the collapse of the communist regime and respective state structures and institutions, a devolution of the formerly centralized governance was initiated. In this context, the Albanian-wide establishment of Fishery Management Organizations (FMOs) was realized as part of an ecosystem-based and integrated water management approach promoted by international organizations, the EU, GEF (Global Environment Facility), and the World Bank from 2002 onwards (cf. SCHMIDT AND THEESFELD, 2012). At Lake Shkodra, the introduction of the FMO as decentralized element for fishery management was internationally supported in the frame of the Pilot Fishery Development Project (WORLD BANK, 2008). About 230 000 people live at the Albanian side of Lake Shkodra, most of them in the largest towns Shkodra and Koplik. The average GDP per capita in the Shkodra region is 2 200 Euro (APAWA, 2012). In the communities around the lake, about 200 families directly depend on small-scale commercial fishing (information from interviews, cf. data from 2004 in SANDLUND). Besides fishery, agriculture and tourism are the main sources of income at the Albanian side of Lake Shkodra.

In 1983, the Montenegrin part of the lake has been declared as National Park (IUCN Category II) and approved as Ramsar site in 1995. The Albanian part was declared as Managed Nature Reserve (IUCN Category IV[19]) in 2005 and designated as Ramsar site in 2006. The conservation of biodiversity in flora and fauna as well as the sustainable socioeconomic development are the focus of the protected area (DEDEJ *et al.*, 2010).

4.2 Characterization of the Resource System

Lake Shkodra has a varying surface area, depending on the season: during summer months, the surface area comprises approx. 350 km^2 (or 1.7 km^3), whereas the area almost doubles in winter with a surface of 500 km^2 (4.0 km^3). The total catchment area is approx. 5 500 km^2 (VUGDELIC, 2010b). Due to the dominant karst topography in the Dinaric mountain range, Lake Shkodra is an important freshwater resource, influenced by the biophysical and chemical conditions of the main tributary at the Montenegrin side as well as various smaller springs and

[19] IUCN Category IV – Managed Nature Reserve; protected area mainly for conservation through management intervention (PIMBERT AND PRETTY, 1995, p. 3)

streams, originating in the surrounding alpine region. Due to the connection with the Adriatic sea through the Buna River in Albania, the lake and its associated habitats are of outstanding importance also for migratory fish species, e.g. eel. The shallowness of the Lake (4 to 9 m in summer and winter, respectively), and the rapid water turnover through in- and outflow result in a low retention time of sediments, and eutrophication is largely prevented. The lake is characterized as mesotrophic (SKARBØVIK *et al.*, 2014, p. 677).

As "the largest freshwater basin in [the] Dinaric mountain range" (VUGDELIC, 2010b, p. 9), Lake Shkodra has an outstanding importance for flora and fauna and provides a great diversity of aquatic habitats, ranging from marshlands, extensive wetlands mainly in the eastern part of the lake, to submersed carpets of macrophytes. The western shore of the lake is characterized through the accompanying terrestrial shrubland and steppe vegetation on rocky ground. DEDEJ *et al.* (2010) number the diversity of – mostly migratory – bird species with 203 listed species (of which 46 are water birds), over 460 species of phytoplankton, and 56 species of fish (DEDEJ *et al.*, 2010; RAZNATOVIC AND DHORA, 2001). According to VUGDELIC (2010b, p. 10), a total of 2 510 species is described at the Lake, among which many are considered rare or endemic and are hence of particular interest for conservation, e.g. the Dalmatian pelican or the endemic Skadar rudd (*Scardinius knezevici*). Due to the Lake's communication with the sea, migratory (e.g. Twaite shad, lat. *Alosa fallax*) and marine species (e.g. Grey mullet, lat. *Mugil cephalus*) of commercial interest can be temporarily found among the fish fauna, along with a variety of autochthonous species such as Common carp (*C. carpio*). About ten fish species are subject to commercial exploitation through small-scale fishery at Lake Shkodra, of which bleak (*A. albidus alborella*) with approx. 60-70 % and Common carp with 10 % represent the largest shares of the catch, based on reports from fishermen (SANDLUND, 2004).

Despite the prominent natural importance of Lake Shkodra and adjacent ecosystems, several threats were identified for the ecosystem. According to AXHEMI AND AXHEMI (2015); DEDEJ *et al.* (2010) and GRUDNIK AND KAJSEK (2011), and in line with findings from qualitative interviews, the following pressures were revealed:

- ▷ (Illegal/uncontrolled) hunting and fishing activities
- ▷ Wastewater and urban waste discharge
- ▷ Illegal construction on the lake shore
- ▷ Introduction of alien species (non-native fish species e.g. *Carassius gibelio*, *Perca fluviatilis*) between 1974 and 1985 (APAWA, 2012)

The great diversity of habitats and species of interest for conservation confronts with the interests of local users, who extract resources for consumption and the generation of income. To avoid overexploitation of the common-pool resource fish, this appropriation (harvesting of

resource units) process reveals the need for management strategies that conciliate between actors[20] with diverging aims of resource use and protection.

4.3 Fishery Management and Nature Protection

Though transboundary, no joint approach to the management of the resource system concerning fishery was present for the Albania and Montenegro. Border patrols enforced the particular system boundaries for the the respective riparian states. The governance of the Albanian part of Lake Shkodra comprises the management of fishery through input and output controls on the one hand, and the protection of habitats and species on the other. The harmonization of both sectors is subject to national policies, which are affected through international directives, e.g. the Birds and Habitats Directives, and conventions in need for national implementation, especially with regard to the EU accession process. Of particular importance for the legal framework of Lake Shkodra in terms of nature protection and fishery are the memberships of Albania in the Helsinki Convention on transboundary waters, the Bern Convention on conservation of habitats, flora and fauna, the Bonn Convention for the conservation of migratory species and the Åarhus Convention (BEKTESHI *et al.*, 2013), dealing with access to information about the environment and "public participation in decision-making" (*ibid.*, p. 8). The translation of international legislations and objectives into national policies and local implementation measures involves action situations at the constitutional and collective-choice level, that lead to outcomes in the focal appropriation action situation. Consequences for the management at local level are found in the design of the operational rules-in-use. Current operational rules regarding fishery at Lake Shkodra define legal fishing gear, target species and according size-based limitations, as well as closed seasons during spawning period. A comprehensive overview of input and output regulations is provided in Table 4.2. Non-compliance with the regulations is punished with graduated sanctions, ranging from monetary penalties to the confiscation of boats, cancellation of a license or jail sentence. The severity of the cause is evaluated through inspectors (state or employed through FMO) or the police.

At the time of the study, the protection of Lake Shkodra through the designation as Ramsar site and Managed Nature Reserve faced constraints regarding institutional capacities and financial and human resources, especially regarding the enforcement of formal regulations for fishing activities (BEKTESHI *et al.*, 2013). Despite these reported limitations, it was stated that the illegal use of dynamite had been curtailed completely, and also the use of generators had been reduced significantly in recent years, as indicated in AASD (2012) and during interviews with the FMO management board.

In terms of nature conservation the zonation of the protected area had been revised in 2015 and revealed areas with particular importance for conservation, e.g. due to their importance as

[20] The terms actor, participant, and stakeholder will be used interchangeably in this study.

Table 4.2 – Regulations for fishery at Lake Shkodra based on Regulation No. 1, FISHERY DIRECTORATE (2005), in force October 2015.

Output controls		
Size-based regulation	Species name (lat.)	Minimum size
	Common carp (*Cyprinus carpio*)	30 cm
	Bleak (*Alburnus albidus alborella*)	10 cm
	Crucian carp (*Carassius carassius*)	15 cm
	Twaite shad (*Alosa fallax*)	20 cm
	European perch (*Perca fluviatilis*)	15 cm
	European eel (*Anguilla anguilla*)	25 cm
	Common roach (*Rutilus rutilus*)	12 cm
Input controls		
Closed season	Carp, Common nase (*Chondrostoma nasus*), roach, bleak	1^{st} April – 15^{th} May
Mesh-size regulation	Gear and species	Minimum size, internal distance between two knots opposite one another:
	Trawling gear	40 mm
	Trammel nets and gillnets for bleak	28 mm
	Gillnets for Common carp	80 mm
Type of gear	No trawl nets, dredge, toxic, narcotic or corrosive matter, or other explosive material or electrical power	
Number of rods and hooks/legal entity	Not specified	
Number of licenses	Revised annually	

spawning grounds for fishes or as natural monument (e.g. springs or cryptodepressions). These areas are subject to future considerations regarding the design of measures for the conservation of resources and habitats at the lake, as already laid out in the most recent management plan of 2012 (APAWA, 2012). At the time of the study, interviewees did not refer to distinct regulations for the Managed Nature Reserve other than the input and output controls presented in Table 4.2.

Within the setting outlined above, various stakeholders can be positioned according to their attributes, roles, individual actions and resulting (potential) outcomes, as well as their control, available information and perceived costs and benefits of actions and outcomes (ANDERIES AND JANSSEN, 2013, cf. Chapter 2.4.2) as elaborated in the following.

4.4 Introducing the Actors

The appropriation action situation at Lake Shkodra involved a variety of participants at the local, regional and national level. The different actors and their positions enabled the definition of focal actor groups relevant for the further analysis. These groups were determined according to their goals, the available strategies and norms according to their assigned position and subsequent rights and responsibilities. MCGINNIS AND OSTROM (2010) also point out the importance of access to or availability of information for respective groups of actors. The distinction of actor groups at local, regional and national (and international) scale facilitated the delineation of the actors' positions and ties within a nested structure of hierarchical levels. In the following, the types of actors identified in Table 3.3 are described in more detail related to their position within the SES framework (variables related to GS5, for nomenclature see Table 3.2).

In the decentralization process, responsibilities for fishery management were vertically distributed among legal entities in form of fishermen and management authorities through an agreement with the Council of Ministers (No. 6213, 09/09/2013). At the local level, the largest focal actor group is represented by the fishermen with a total number of 457 licensed professional and amateur fisher (according to FMO, 2015) and an estimated number of 39 unlicensed individuals, as reported by AASD (2012; see also APAWA, 2007). Using either hooks or nets and small motor boats, fishermen target about ten commercial fish species of which Common and Crucian carp (*Cyprinus carpio* and *Carassius carassius*), European eel (*Anguilla anguilla*), bleak (*Alburnus albidus alborella*), and Twaite shad (*Alosa fallax*) are of greatest economic value. Licensed fishermen at Lake Shkodra shared the common strategy of sustaining (part of) their income through resource extraction, and thus rely on the availability of commercially exploitable fish stocks. At an individual level, fishers aimed at maximizing their daily catch for higher profits. Since the establishment of the Fishery Management Organization (FMO) as an element for collaborative management (GS5.3) at Lake Shkodra in 2002, fishers were automatically registered members of the FMO when purchasing a license. The license was attributed to the used fishing gear and specifies the holder as well as the individual number of the holder's boat. Fishermen exhibited a certain degree of socio-cultural and cognitive heterogeneity as related to traditions, religion (Christian/Muslim), power relations with regard to their connection to politicians or other influential individuals, and fishing tradition. Some attributes of fishermen could be distinguished spatially, contrasting the eastern and the western lake shore. Following this introduction, the spatial differences are addressed in more detail within the analysis of outcomes for the focal action situation (Chapter 5). By law, fishermen are obliged to report their catch statistics at an annual basis to the FMO, which in turn is responsible to the ministerial authorities who then decide about the number of licenses issued the following year.

The internal structure of the FMO as laid out in the Law on Fishery No. 64/2012 (Art. 59, 60) consists of the general assembly as the main decision-making body, an administrative council responsible for monitoring and controlling of the FMO, the FMO chairman, an audit commission, a commission to resolve conflicts and the executive staff which implements and enforces the operational rules. The budget of the FMO is composed of membership fees as well as any donations and incomes generated through activities of the FMO. Additional funds are required to be spent to fulfill the organizations objectives, comprising the enforcement of regulations for "the conservation of ecological balance and rational exploitation of fish resources" (Agreement No. 1363, February 26, 2014; printed information material from FMO of October 2015). A total of eleven local representatives, in general also members of the FMO, are elected by the fishermen in each fishing community. They take part in the (annual) meetings of the FMO and act in the interest of all licensed fishermen at the general assembly. Since 2014, the agreement No. 1363 with the Ministry of Agriculture, Rural Development and Water Administration (MARDWA) transferred further responsibilities of environmental protection to the FMO. At the time of the study, the duty of controlling and enforcing operational rules was performed by two guards employed through the FMO, and two inspectors responsible to the Directorate of Environmental Control under the Ministry of Environment (MoE). The primary goal and role of the FMO – representing the interests of fishermen and promote "sustainable fisheries and the economic well being of the fishermen" (EUROFISH MAGAZINE, 2012, p. 20) – contrasted somewhat with the assigned position as controlling body, as this dual capacity reflects contradictory responsibilities. In the position of decision-making and enforcing regulations, the management body of the FMO was characterized as second focal actor besides fishermen for the case study at hand. Through its intermediary position, the FMO bridges the local (GS5.1.3/GS5.2.3) and the national organizational level (GS51.1/GS5.2.1) of governance.

Further important actor groups were identified at the regional level: the Regional Environmental Agency (REA), Transboundary Forum of Shkoder/Skadar Lake, hosted by the Regional Environmental Center of Shkodra, and a variety of NGOs are the main participants concerned with the protection and sustainable use of natural resources alongside fishing activities at the lake. The REA depends on the MoE and is in part responsible for the monitoring of management processes related to environmental concerns. Objectives of regional NGOs are similar to those of the FMO, in that both actors emphasize the importance of sustainable fishery as livelihood strategy and the need for protection of natural resources at Lake Shkodra. Non-governmental, intermediary level actors like NGOs substantially support the legislation and management (implementation) process, e.g. through projects on environmental education or stakeholder workshops, without a necessary direct influence in the decision-making process. This is also true for scientists from the universities of Shkodra and Tirana, who conduct research on biological, chemical and physical parameters, hereby contributing to the gener-

ation of knowledge necessary for the concerns of resource use and protection. Authorities with decision-making power at the constitutional scale are allocated at the national level at the Ministries (MoE and MARDWA) and respective Directorates of Fishery and Biodiversity/Protected Areas (GS5.1). Figure 4.1 illustrates the organizational structure within the relevant ministries.

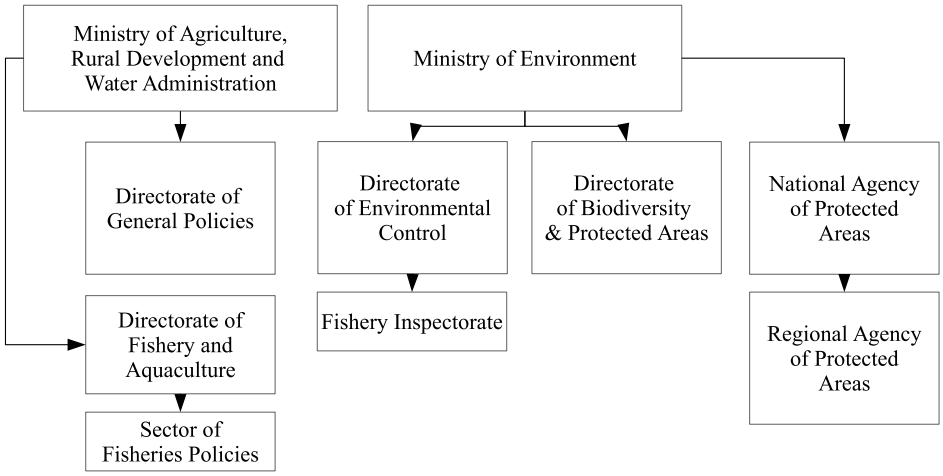

Figure 4.1 – Organigram of the relevant structural parts within the MARDWA and MoE of Albania, January 2016 (information from interviews and PEVELING *et al.*, 2015).

Governmental actors are mainly concerned with the harmonization of regulations on fishery management and nature conservation with the EU *acquis* in order to advance the accession procedure. From the perspective of national authorities the decentralization process and according delegation of responsibilities provides benefits in that the FMO provides data on biological monitoring, is responsible for the implementation and enforcement of the legislation and assembles the interests of local users. At a legal basis, the concept of public participation in decision-making is anchored in the Albanian legislation and adaptations to the existing legislation as well as new laws require the input of actors at all levels, but eventually need the approval of state authorities. An example for this procedure was found in the co-management plan for Lake Shkodra that had been developed jointly by actors at regional and local level and was awaiting the ratification of the Minister prior to implementation (information from interview with FMO/person in charge from MARDWA, October 2015). Besides the above named focal actors, Working Groups initiated in the frame of development projects comprise individuals associated with each of the described levels of scale and governance authority,

and are therefore regarded as temporary hybrid organizations (GS5.4), combining public, private and voluntary organizations as e.g. the Joint Working Groups in the frame of the "Lake Skadar-Shkodra Integrated Ecosystem Management Project" (VUGDELIC, 2010a). Support at the institutional and structural level is also provided through international organizations in the frame of projects, e.g. Conservation and sustainable use of biodiversity at Lakes Prespa, Ohrid and Shkodra/Skadar (GIZ), or Supporting the Long-Term Sustainable Management of Transboundary Lake Skadar (IUCN).[21]

5 Analysis of (Social) Outcomes

Proceeding the outline of relevant characteristics of the resource system and resource units (RS and RU), the actors with their according positions (A) and the overall governance system (GS), a thorough analysis of the outcomes obtained from the configuration of the appropriation action situation situated within the SES framework is set about. The delineation of the SES into the (harvesting) action situation revealed the micro-level outcomes of compliance, the likelihood of self-organization and social fit. Within the appropriation action situation, special focus is directed at the variables of the social dimension that underlie and affect the focal situation and the emerging outcomes. The following analysis is structured as follows: for each micro-level outcome a short description is provided at first and then extended through a thorough analysis of variables and interactions through the application of the SES framework.

5.1 Compliance

5.1.1 Description of Outcome

Rule compliance of fishermen at the lake is intertwined with the wider social, economic and political setting (S) and strongly shaped through history. Fishermen expressed their perception that during the communist time the state was strong enough to enforce the formal regulations and no illegal fishing activities were tolerated (see also GRAZHDANI, 2014), was found to influence the current attitudes of fishermen towards the controlling authorities. The frequently expressed view that in the time of the communist regime "everything was seen by the others [...]", and "you could not catch all fish that you wanted" was contrasted to statements about the present situation, where fishermen "[...] see the electric generators, but turn a blind eye and say nothing" (fisher_10 and ret_1). As reported in interviews, levels of compliance vary between the eastern and western part of the lake. Whereas in the villages of Zogaj and Shirokë

[21] For further information, see project websites of GIZ and IUCN (last access February 22, 2016).

http://www.giz.de/en/worldwide/20318.html
http://www.iucn.org/about/union/secretariat/offices/europe/activities/current_projects/?13998/Supporting-the-Long-Term-Sustainable-Management-of-Transboundary-Lake-Skadar

(see Figure 3.1 on page 48) respectively all or most fishermen were licensed and reported to comply with regulations, a higher number of unlicensed fishermen or licensed fishers using illegal methods was documented for communities at the eastern shore, like Kamice and Stërbeq (cf. AASD, 2012). Fishing as a traditional activity, especially in the village of Zogaj, was associated with higher levels of rule compliance, which fishers from Zogaj explained through their better knowledge of the resource units and fishing techniques. The influence of the level of enforcement of monitoring and sanctioning mechanisms as part of the operational rules is of particular interest in terms of rule compliance. Respondents stated that monitoring activities were most intensive during the time of the closed season from 1^{st} April to 15^{th} May. All interviewees unanimously affirmed that the enforcement of sanctions is essential, though "sufficient control will never be possible as long as fishers do that for their daily survival. Because as long, illegal fishery will always persist" (FMO_1). Despite the appreciable reduction of illegal fishing activities indicated in reports from 2007, 2010 and 2012 (VIJA, 2010; AASD, 2012) compared to the situation in 1991/92, still an unknown number of unlicensed fishermen and illegal practices was assumed. Interviewees attributed the decreases in observed illegal fishing activities to stronger state control mechanisms in recent years. Though the interviewed fishermen were aware of the existing regulations regarding mesh sizes, length-based restrictions and the time of the fishing ban season, all interviewed fishers criticized that their implementation, thus enforcement, was still poor. However, from 17 interviewed fishermen, only three fishers stated that regulations were not sufficient and clearly demanded more rigorous rules. The enforcement of stricter rules through nature conservation authorities, accompanying the proclamation of Lake Shkodra as protected area, was conceived as positive by all but two out of 17 fishermen, who perceived neither benefits in relation to fishery nor disadvantages through protection measures. Nevertheless, monitoring and sanctioning of non-compliant behavior was still undercut through bribing activities and beneficial friendships that pertained through networks between fishermen, inspectors, and authorities of the FMO management body, as stated by fishermen. Corruption was enabled through networks and corresponding trust relations among members within the network. The enforcement of regulations as well as the level of corruption were perceived as constraints for the legitimacy of actors in charge and deterring the full legitimacy of the management system. This lack of legitimacy, which was mainly expressed during interviews with fishermen, was found to negatively affect the willingness to comply of some interviewed resource users. In the following, the results for the variables and interactions that underlie the depicted situation are analyzed in-depth.

5.1.2 Interacting Variables

Compliance with operational rules (GS6.1) – designed to regulate fishing activities and subsequently lead to resource conservation – is shaped through a variety of interacting variables among the first-tier variables governance system (GS), actors (A), resource system (RS) and resource units (RU) as illustrated in Figure 5.1 and further delineated below.

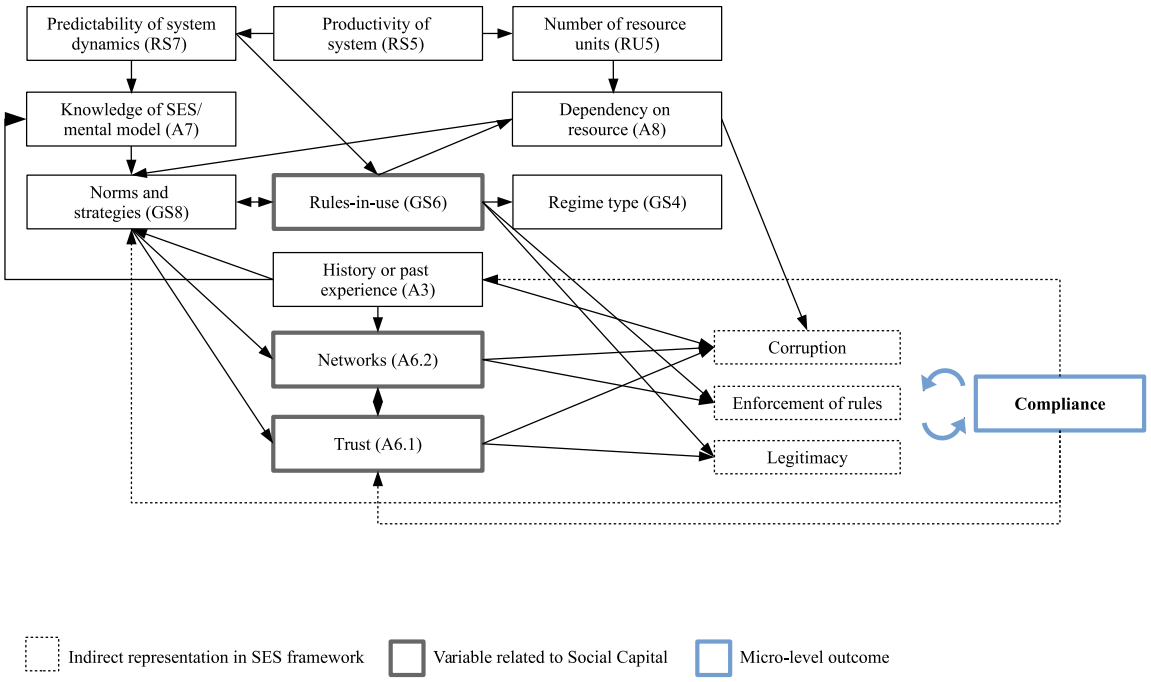

Figure 5.1 – Variables involved in interactions leading to compliance as micro-level outcome of the appropriation action situation.

Biological monitoring (I9) of fish stocks (reliable information about RS5 and RU5 was largely missing or outdated) and the difficulty to predict system dynamics (RS7), e.g. as a consequence of the mobile nature of the resource (RU1), were seen as constraints to effective management of fishery by interviewees from all actor groups. Uncertainty about the effects of harvesting rates both from the management side and resource users influenced joint and individual evaluation processes (I10), feeding back on the rules-in-use at operational, collective-choice and constitutional level (GS6) as well as on the actors' mental models (A7).

During the interviews, more than half of the respondents referred to fishery management during communist times and expressed a positive notion of their past experience, acknowledging that "[Enver Hoxha] was a dictator, but the rules that he had were good for the region" (fisher_15). In this context, two aspects were frequently mentioned: first, during communism the state

ensured a regular salary and provided material such as boats and nets for the fisher, and access to the lake was controlled through strong enforcement. The second aspect concerned the limitation of the number of licensed fishermen as well as the precondition of having passed the professional school for fishery ("During that time they were paid well and had a good living. And in that time they were 130 Fischer and now there are many more", fisher_3). This past experience of state control (A3) was compared with the actual situation (I10), as apparent during interviews, when fishermen expressed their perception that the state today is not interested in the enforcement of regulations. The positive record of fishery management from communist times is ousted through the turbulent times that followed the collapse of the regime in 1991/92, when "people stole so many things and all boats had weapons [...] and free fishing was not possible any more" (fisher_1) because of strong competition. Prior established institutions and state structures were destroyed in the years following the breakdown. In this time of quasi open-access, a massive increase in the number of fishermen was reported, who "fished without criteria" (fisher_4). Since then, a high number of illegal fishing activities was observed (fisher_4, fisher_16, locNGO_1) that only decreased in recent years. The transition period towards decentralized ecosystem-based management (GS4, GS10), which was supported through international organizations from 2002 onwards, was again linked to current levels of compliance, as experiences from the time of transition were found to feedback on actual behavior and the attitudes and mental models (A7) of actors, particularly of fishermen. The promoted changes in the management structure were accompanied by high levels of corruption that impeded the enforcement of fishery regulations and gave way for illegal activities – a situation described by respondents from all actor groups for the time after the introduction of the FMO. The uncontrolled use of electric generators and dynamite fishing were frequent methods which could be observed openly during that time. Reasons for this were seen in a combination of low enforcement capacities, e.g. for inspections, the absence of informal institutions that would generate incentives for compliance and corruption that enabled non-complying individuals to escape sanctions. This even led to increased non-compliant behavior, as two fishermen report during the interviews, since rule compliance meant missing today's benefits while watching others exploit. The perception of unfairness, the mostly absent threat of punishment (through a lack of both formal and informal sanctioning mechanisms), and the need to make a living in the economic crisis were reported as reasons for the reduced willingness to comply at that time.

These shared past experiences of fishermen at Lake Shkodra facilitated the analysis of current levels of reported rule compliance and revealed similarities regarding the aspect of fairness. At the time of the study, the understanding that compliance would be beneficial for the sustainability of the targeted resources, i.e. commercial fish species, prevailed among the group of fishermen. However, this understanding was still undermined by reported corruption and, associated to that, information about non-complying behavior of colleagues, as expressed

e.g. by one interviewee “either no one is allowed to fish during spawning season or everyone. Because the [fisher from Zogaj] can not and the others can and that does not work” (fisher_2). Given the expressed awareness of fishers, the demand for increases in awareness raising activities, as e.g. highlighted in the interview with Minister Panarati in EUROFISH MAGAZINE (2015) or by NGOs (natNGO_1), conflicted with the already established understanding of the behavioral consequences that fishermen expressed during the interviewees.

Regarding the attributes of the fishermen, communities in the eastern and western part of the lake can be distinguished according to their dependency on fishery (A8). While in eastern communities like Kamicë and Stërbeq at least some fishers and their families “who have land or a cow” (fisher_16) or invest in herb production (mainly sage) had income alternatives, the opportunities were reported to be scarce for the communities in the western part (Shirokë and Zogaj). The geographical terrain of the area does not allow agriculture because of steep hills and a lack of fertile soils, so that – if anything – a small number of olive trees was reported to be the only other income opportunity besides fishery. The actor group’s heterogeneity, reflected in the distinction between communities at the eastern and western shore according to the importance of fishery, was acknowledged by fishers and other actors (scientists, NGOs and international organizations) alike, as confirmed through interviews. In the fishing community of Zogaj, and partly in Shirokë, knowledge about sustainable resource use was reported to be passed through generations (I2). A long tradition and a strong community network (A6.2) did not allow outsiders to enter the (I8, I9), which was also supported by the high visibility of entry points due to the geographical conditions of the resource system. The bonding ties (A6.2.1) between fishers from Zogaj were found to be particularly strong as they also span through family and kinship ties, facilitated through the limited community size of approx. 50 families. In contrast to that, fishing communities in the eastern part of the lake were less exclusive and ties were not equally strong so that fishermen reported the moving in of “new” fishermen from outside the communities without fishing tradition, e.g. from mountainous regions. Aspects of non-complying behavior were more frequently discussed in interviews with fishermen from the eastern shore.

Besides, rule compliance extended the scale of operational rules (GS6.1) and was also addressed at the normative scale (GS8). The level of reported compliance with social norms, e.g. respecting the property of colleagues, was again different for the eastern and the western part of the lake. Whereas in Zogaj fishers reported that they “can leave many [of their] things, no one will take it”, other fishermen stated their fear that “I go home now, then someone comes, sees my hooks and takes what he wants [...]. No one does anything about it” (fisher_2 and fisher_8, respectively). This behavior created a low amount of interpersonal trust (A6.1) among fishermen from the eastern shore. Out of 17 interviews with fishermen from all parts of the lake, only one stated that he generally trusts other fishermen, and one explicitly expressed trust in the ability of the inspectors to monitor and sanction non-compliant behavior. The

other respondents shared the overall perception that “there is no trust, there is no honesty” (fisher_15). However, this interestingly did not decide about – at least stated – friendship among fishermen. In this sphere of distrust, resource users were found to act in their own interest at an almost individual basis, only including family members or close friends, limiting networks mainly to bonding ties (A6.2.1). The narrow network bonds prevented the emergence of strong informal institutions – from which non-compliers profited in that there was a low level of social sanctioning (as part of the operational rules, GS6.1 and norms and strategies with informal sanctioning processes, GS8). In case fishermen gave notice of illegal fishing activities, they informed the police or FMO, but only two interviewees reported that they directly confronted deviators, because they feared personal harm in case of a conflict (potential for I4). The likelihood of reporting violations was further hampered in that non-complying behavior of colleagues was frequently justified either by their economic dependence on the resource (A8.1), or their involvement in bribing activities with authorities. Especially the involvement in corruption was reported to reduce the chance of social sanctioning mechanisms by means of power inequalities arising through this form of networks with authorities (vertical networks, A6.2.3). Out of the total of 36 interviews, 17 respondents across actor groups (10 fishermen) explicitly acknowledged the widespread corruption: “from the central and to the local [level], we have the same story and the same situation”, “[...] this is the mentality in Albania” (natNGO_1). Main forms of appearance of corruption were reported for the avoidance of sanctions (“[The inspectors] can see the unlicensed fishers and say okay, give us two or three carps and everything is fine” [rec_fisher]) and involved monetary payments and payments in form of resources, e.g. fish. Corruption was identified as result of the interactions of network variables, e.g. bonding ties between individual fishermen and inspectors, trust, and operational rules, i.e. the enforcement of formal sanctioning was not reliable. The linkage of corruption to the (perceived) low level of enforcement of formal institutions reduced the trust that actors expressed towards the co-management regime as such and affected the perceived legitimacy.

According to governmental authorities, the co-management arrangement was widely perceived as means to increase compliance – a view which was also supported in interviews with representatives of international projects present at the lake as well as local NGOs. At the same time, these actors highlighted the need for stronger coercive measures as well, expressed not only during interviews but also in an interview of the Eurofish Magazine (2015) with Albania’s Minister of Agriculture, Rural Development and Water Administration, who stated that the number of personnel obliged to monitor and sanction should be increased, hence coercive measures intensified. With respect to the interviews with fishermen, the management regime in place rarely influenced their individual compliance behavior: fishermen reported to be in line with existing regulations, but criticized the lack of formal enforcement and sanctioning processes (I9 of GS6.1). In contrast to the stated legitimacy of the rules-in-use, legitimacy

and support regarding the management was found to be reduced through an expression of disregard concerning the professionalism of the FMO's administrative body and distrust as a consequence of intransparent information sharing activities. The topic of legitimacy will be revisited in the context of the outcome of social fit in Chapter 5.3.

5.2 Likelihood of Self-organization

5.2.1 Description of Outcome

The second micro-level outcome identified within the appropriation action situation at Lake Shkodra relates to the likelihood of self-organization for sustainable resource use. Whereas the co-management regime envisaged the delegation of some responsibilities to the local level, actual cooperation of actors enabling self-organization was found to be weak for most actors at the lake. In all but one fishing communities, fishing activities are carried out at the individual or family level, at most including close friends. Self-organization activities were only temporarily found at the western shore of the lake in the community of Zogaj, where fishing during winter is collectively organized and profits are equally shared among participants of the fishing activity. In general, participatory mechanisms for decision-making or deliberation were rare and only few fishermen took part in the frame of FMO meetings. Though the mental models towards resource use and protection aligned for all interviewed groups of actors at Lake Shkodra, connectivity and communication of these common viewpoints through formal and informal networks of information exchange was reported to be limited. During the interviews, respondents from local actor groups (e.g. fishermen, local NGOs, inspectors and FMO) stated prevailing low level of trust and missing networks among actors, resulting in a circle of positive, reinforcing feedback loops along the variables of social capital (trust, networks, institutions) in that self-organization, networking and information sharing activities were insufficiently established. The formulation of a shared understanding of resource use and protection at the lake was identified as intermediary step on the way to cooperation and collective action for resource appropriation. Possible benefits, e.g. arising from collectively organized marketing of daily catch (benefits could encompass stable returns and adequate prices through controls of legality) were foregone. Instead, individual patron-client relations with a limited number of bonding ties remained. The interviewees responses highlighted the necessity to take into account the historical past of the management regime, where – though organized in collectives – state control suppressed self-organization, hence no history of collective action concerning the governance of resource extraction had been be established at Lake Shkodra.

5.2.2 Interacting Variables

In the appropriation action situation, fishing activities (harvesting of RU, I1) are the major concern that requires (collective) action. In the presentation of the SES framework, OSTROM (2009) highlighted a number of ten variables associated with the likelihood of self-organization in settings facing common-pool resource dilemmas.[22] Figure 5.2 gives an overview of the involved variables and interactions identified at Lake Shkodra, which will be further elaborated in the proceeding chapter.

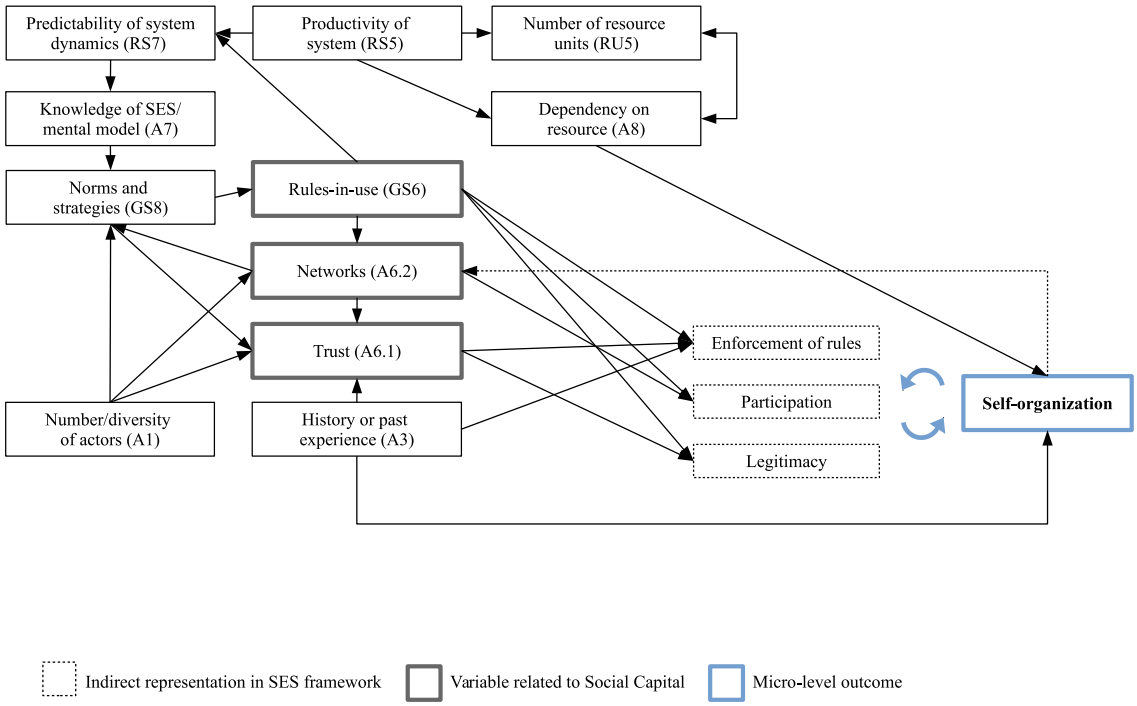

Figure 5.2 – Variables involved in interactions leading to the likelihood of self-organization as micro-level outcome of the appropriation action situation.

Fishery in the time of communism was centrally planned by governmental authorities and decision-making responsibilities fully relied on top-down structures (GS10). This central state organization ensured the provision of data, e.g. on catch rates, which then served as basis for the management plans. During interviews, older fishermen reported that they were divided into groups of which each had a designated area for fishing. Strong control mechanisms

[22] As outlined in OSTROM (2009), these ten variables are: the size of RS (RS3), productivity of RS (RS5), predictability of RS (RS7), RU mobility (RU1), number of actors (A1), leadership (A5), norms and social capital (A6), actor's knowledge of the SES (A7), the importance of the resource to actors (A8), and collective-choice rules (GS6).

restricted access, “because everything was observed by the others and they could not fish in other zones” (fisher_1), as one fisher reported who started fishing in 1973. Besides strict regulations, fish stocking with native species – and since 1980 also with non-native species, e.g. Prussian carp (*Carassius gibeli*o) and perch (*Perca fluviatilis*) – was conducted by the state, an activity with a positive connotation as expressed by interviewed fishermen. Stocking activities and continuous biological monitoring were carried out until 1991. In general, past authoritarian control and organization was still associated with higher benefits in terms of secured livelihoods by regular salaries and marketing and distribution of fish catch (A3) in the eyes of the fishermen. In total, seven fishermen stated during interviews that they had started fishing prior to 1991/92, in contrast to ten interviewees, who only began commercial fishing activities after the collapse of the communist regime. During the time of the communist regime between 110 (GRAZHDANI, 2014) and 130 fishermen (fisher_1 and fisher_3, respectively) were active at Lake Shkodra. In 2015, a total of 210 subjects (boats) were licensed, with two registered fishermen per boat – indicating a minimum number of 420 fishermen (A1) legally fishing at Lake Shkodra. Compared to the situation after the collapse of the communist regime, where reports note numbers of up to 1000 fishers (ROYAL HASKONING, 2006; GRAZHDANI, 2014), a considerable reduction in the number of fishermen was obtained, a fact that was also acknowledged by all interviewees.

Alongside fishermen as primary resource users at the lake, their interactions with stakeholders at local, regional and national level constituted the current configuration of the action situation. Networking activities (I8) among fishermen of the same community took place on a daily basis during landing and interactions with the retailer, and exhibited strong, but locally constrained, bonding ties (A6.2.1). During interviews, fishermen referred to their colleagues from the same area (some of which were also introduced as friends), when asked about connections between fishermen at the lake (“We are, the ones who come here, we know them all, they are all licensed”, fisher_11). At the landing sites, fishers (and retailers) jointly discussed their problems, shared information about the resource (RU) and catch rates. In the absence of formalized biological monitoring measures (I9), e.g. through reported catch rates, the state of the resource (e.g. abundance or scarcity; RS5, RU5) was valued subjectively or during group discussions. One fisherman noted that conversations about the state of the resource were particularly frequent when the catch was low (fisher_17). These locally confined and informal information sharing activities (I2, involving I8) led to a common understanding of the system functioning (A7) and shared attitudes among fishermen at the same landing site, as became evident during the interviews. Regarding the communication structure of fishermen beyond landing sites, there was little opportunity for exchange except meetings organized by the FMO. Yet, the formally recognized collective-choice rules (GS6.2) were still overrode, as elites or more powerful actors (often related to the political system and referred to in interviews as “militants”) entered the arena. This constraining situation was recognized

by interviewees throughout the interviewed actor groups, and the perception of helplessness that arising through these power inequalities was shared among fishermen, NGO members and governmental/administrative authorities alike.

Though formally approved in the Management Plan (2004), the participation processes within the implemented co-management regime were reported to malfunction. In the viewpoint of fishermen, their ability to participate in the decision-making process as defined through the collective-choice rules (GS6.2) strongly related to their connection to the FMO (strong bonds through friendships facilitated participation), but was overall low. Though fishermen expressed no particular interest to participate in the decision-making process itself, they missed the representation of their needs and problems at the level of the FMO. This became apparent for the renewal of the hardly visible surface marker buoys at the border to Montenegro. This request was frequently mentioned by fishermen, because fishers were sanctioned by the Montenegrin inspectors when (accidentally) crossing the border while fishing. Out of 22 interviews (of which 13 were conducted fishermen), one fisher stated that his opinion counted for the FMO and the Ministry, and "there are discussions how they can change something". Across actor groups, the other interviewees shared the perception that "in theory [the fishermen] could have a voice, they are free to participate, to discuss. [...] but how and in what degree this is implemented, this is not in [an appropriate] level" (natNGO_2).

Besides the constraints arising through limited network outreach, participation opportunities and power inequalities (also related to corruption), incentives to self-organize were also found to be influenced through the pertaining mental models (A7) of the actors at the lake. In the case of fishermen, a close examination of responses revealed that though strong negatives attitudes were expressed towards the FMO, most interviewees perceived potential future state control as more repressive and less likely to be beneficial. The view that – with the long-term perspective of legitimate leaders – the FMO would more beneficial than full state control was expressed in six interviews with fishermen. This is contrasted to only one interview with a group of fishers who clearly favored state control over the FMO structure. In that regard, a dichotomy was identified regarding the role of the state in the viewpoint of the fishermen: when referring to communist times, a positive connotation of state control was expressed. The present perception however revealed high levels of distrust towards state authorities and the notion that the state would not act in the fishermen's interest. From the viewpoint of NGOs, state authorities and scientists, support for the co-management structure was affirmed while at the same time the need for improvements of the current situation was emphasized in terms of enforcement capacities (enhancing e.g. the personnel and monetary conditions), transparency, and governmental support.

Equal to the differentiation of fishing communities at the eastern and western shore in respect of levels of compliance (Chapter 5.1), greater reference to networks at the "own" side of the lake (ties represented through A6.2.1) was made. This came along with the perception of

common understandings related to fishery within the same group of residents (A7, embedded in reported GS8). Several fishers similarly expressed that "the fishers who fish at this side will share this opinion. But the ones at the other side [...] won't" (fisher_1), a statement which was common for relations towards eastern and western fishermen, respectively. The emergence of shared attitudes was partly apparent for the perception of the fisher's situation, e.g. "we here in Zogaj [...] want to protect the fish and not fish with illegal methods. But what the others do is another thing" (fisher_4). Depreciative attitudes or accusing remarks were mentioned reciprocal in relation towards non-residents or actors from the other side of the lake, respectively. The spatial distinction regarding the distribution of strong bonding ties was congruent with the level of interpersonal trust (A6.1). The expressed distrust towards fishers from other communities hindered extensive social exchange between the eastern and the western side of the lake. Statements in the interviews showed that trust between individuals across family boundaries was in general rather low ("We can trust no one. As soon as I turn my back on it [...]", fisher_10). The limited exchange of actors beyond landing sites and residency was also attributed to the size of the resource system. The perception that "the lake is big, it is enough space for everyone" (fisher_7) incentives for exchange were largely missing and due to the size of the system large distances between the communities impeded frequent communication. Additionally, differences in network ties were associated with the fishing gear used. Even among fishermen within one community, disparities were identified between fishers using hooks and fishers using nets (potential for I4), e.g. because through close proximity of both gear types in the water, entanglement causes (financial) losses. This conflicting situation was further aggravated through socioeconomic attributes of the actors and the wider social and political system, where "the ones with hooks, their [political] party won. And then they say 'we can do what we want, because our party has won"' (fisher_16), as a group of fishers stated.

Fishermen frequently expressed the notion of relative resource scarcity, though biological monitoring or other information which could allow for scientifically supported considerations was largely missing (lack of data on RS5.1 [I9], thus uncertain predictions about the system and the fish stocks [RS7, RU5]). In interviews, declining catch rates were often linked to illegal fishing activities, and interviewed fishers as well as scientists showed their concern about future resource availability, since stocking was not conducted any more (A7). The perception of relative resource scarcity was also expressed by NGOs and administrative authorities. Besides the sensed consequences at the ecological scale, negative consequences from illegal fishing activities were also found to impose economic threats on complying fishers in that retailers paid less for the fish since supply (high catch rates through illegal fishing methods) was high. The collective organization of the marketing process (I7) with the FMO as intermediary was envisaged in the Management Plan from 2004. Though this approach was highly favored by fishermen since it would have ensured stable prices for legal catch,

and received as potential for improvement by the FMO board, state authorities, NGOs and other organizations alike, it had not been implemented until the time of the study. This finding (revealed during interviews in 2015) disagrees with an article published in 2012, which assured that veterinarian inspection, the availability of storage facilities and the marketing via a limited number of authorized shops was daily routine at the lake (EUROFISH MAGAZINE, 2012). This contrasts sharply with the results from the field study, where instead of the procedure described above, individual patron-client relations remained. Responsibilities for the setting up of such a collective marketing scheme were attributed from one group of actors to the other, e.g. from the FMO to the state, or from fishermen to the FMO, as the interviews revealed.

Self-organization in Zogaj The situation outlined above referred to the studied communities at the eastern and western shores of Lake Shkodra. An exception to the ability of self-organization activities was found in the community of Zogaj at the western shore. While during summer fishing is carried out at an individual or family level (e.g. man and wife, father and son/daughter), fishing activities in winter are collectively organized (I7). The community is characterized by a relatively small size (about 50 families) and their dependence on fishery (A8). Alternative income opportunities are scarce and all interviewees stated to exclusively rely on fishery for the generation of income. As traditional fishing community, interviewees reported that knowledge is passed from generation to generation (I2), and fishers referred to strong bonding ties (A6.2.1), shared attitudes and norms (A7, GS8) as well as high levels of trustworthiness of community members as compared to outsiders (A6.1 in relation to A6.2.2). During winter months, catch rates are generally lower, hence, income from fisheries is less. In order to overcome this shortage, the fishermen keep a net which exists since communist times to catch mostly bleak (*Alburnus albidus alborella*). In the colder months, the gravelly western shores provide habitats for bleak (temporal and spatial distribution of stocks in winter [RU7]). Because of the large size of the net of around 400 meters, fishers need to cooperate. The catch of several tons is kept alive close to the shore in Zogaj until sold. The appointing of night guards reduces the risk that fishermen from the eastern shore "come and take the fish" (fisher_2). Fishers reported to rely on their established trust and reputation mechanisms, as strong bonding ties allow informal social sanctioning in case of a participant's misbehavior or other violations of the collective fishing procedure. This sanctioning was reported to be rare, but might range from verbal admonishment to the exclusion of individuals from the fishing process. Decision-making power over the organization of the fishing activity and the appointment of guards lies with the elderly of the village, who are the most skillful and experienced fishers and regarded as key actors for the cooperation process (A5). The work is arranged in shifts, only allowing actors from Zogaj to participate (GS6.1, I9). On-site marketing of the catch ensures direct returns, which are equally distributed among the cooperating actors.

Interviewees from all groups of actors acknowledged the special situation in Zogaj and contributed their self-organization capacities to the long-time tradition of the fishing community. The recognition of the right to organize, the configuration of social capital and the key actors were found to enable the temporal collective action in Zogaj.

5.3 Social Fit

5.3.1 Description of Outcome

In the analysis of the appropriation action situation at Lake Shkodra, social fit was identified as third micro-level outcome. Social fit was found to be shaped through the legitimacy and accountability of authorities and the management regime. The empirical data showed that the reported legitimacy and accountability were influenced mainly through the level of actor participation and the congruence of expectations and actual conditions regarding the governance of fishing activities. For the analysis of institutional acceptance as proxy for the legitimacy of the institutions in place, a dichotomy was revealed in the interviews. At first sight, priorities of actors related to economically profitable (fishermen) and sustainable resource extraction and protection (e.g. NGOs)[23] and the respective aims of the stakeholder groups aligned with the current institutional setting. All actors expressed their general acceptance of the present formal legislation. However, the legitimacy of the system was thwarted by actors not sharing the norms of sustainable fisheries, since external enforcement of the regulations was too weak and networks and trust not sufficiently established to ensure informal social sanctioning of non-compliant behavior. The linkage of the micro-level outcomes social fit and compliance through institutional acceptance underlined the complexity of mechanisms on the way to sustainable resource use.

The need for public involvement in decision-making for fisheries management was acknowledged especially at higher (hierarchical) governance levels, e.g. by governmental authorities or international organizations, whereas at the local level, resource users highlighted the role of stronger monitoring and sanctioning mechanisms instead of increased opportunities for participation. In the eyes of most fishermen, advances could be achieved through a legitimate leader who would take over responsibility for enforcing regulations without necessarily involving direct participation of all fishermen in the management process. The aspect of hierarchical scale related to upward and downward accountability was identified as important for the analysis of social fit. Social fit as approached through related aspects of legitimacy and accountability highlighted the role of trust and networks as well as the importance of the social context for the congruence of governance aims and stakeholder needs.

[23] The author acknowledges the limited and simplified expression of the actors' priorities related to fishing activities at Lake Shkodra. A more comprehensive overview of positions is given in Chapter 4.4.

5.3.2 Interacting Variables

Narrowing down important variables associated with the fit of institutional arrangements for the social system while acknowledging the normative and behavioral dimension of social fit enabled the analysis of the micro-level outcome. Congruence of the rules-in-use and the social context, the satisfaction of stakeholder needs and expectations as well as the relevance of the spatial and temporal scale are three aspects of social fit that are presented in depth in the following. Figure 5.3 illustrates the identified variables and their relations within the appropriation action situation of the focal SES.

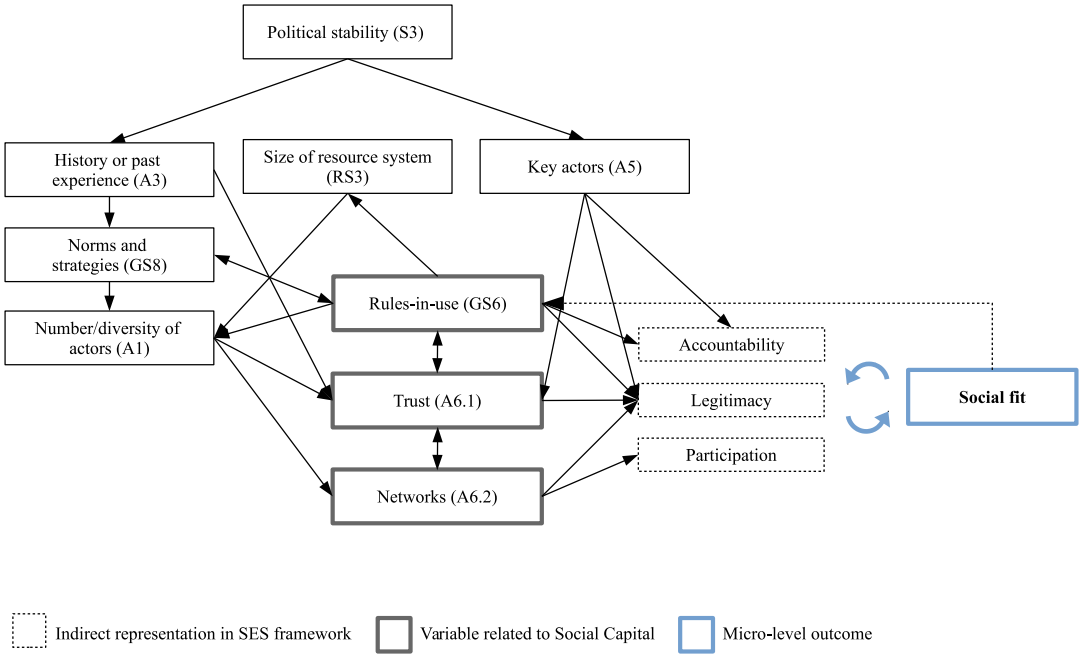

Figure 5.3 – Variables involved in interactions leading to social fit as micro-level outcome of the appropriation action situation.

The congruence of the rules-in-use and the social context in which the appropriation of resources is situated was found to be linked to the legitimacy of the institutions (G6) in place and the management system as such (GS4). Beginning with the legitimacy of institutions, the empirical data revealed consent with the existing operational rules for fisheries at Lake Shkodra across all actor groups (GS6.1) and fault was only found with their enforcement through a lack of properly implemented monitoring and sanctioning mechanisms. The endorsement of the operational rules, hence a general institutional acceptance, was found to be related to the stakeholders' norms and strategies (GS8). However, the acceptance on the one hand was

contested by reports of non-compliant behavior of fishermen and the bypassing of regulations on the other hand, e.g. through corruption as indicated in Chapter 5.1. The divergence of (stated) institutional acceptance and reported compliance with the operational rules displayed the link to the legitimacy of the structural elements of the co-management regime – a finding supported through the statement "the question is [the] implementation of the law. And not the regulation" (natNGO_2). In this regard, special attention was directed towards the legitimacy of local authorities with decision-making and enforcement power, namely the FMO management board (in position of being a key actor, A5). The evinced lack of legitimacy that fishers expressed towards the FMO board ("[The members of FMO board] want to do something and change something, but when [they] depend on the state, they can not do much. [The members of FMO board] can not do what they want, what is just", fisher_4) was related to their perceived accountability and the trust towards state authorities. The FMO as user (community-based) association represents an intermediary between the state agents and the community members at local level, therefore demanding for upward as well as downward accountability. Most frequently named reasons for the lack of accountability from the viewpoint of fishermen were: a lack of transparency, unequal power relations, and lack of enforcement of monitoring and sanctioning mechanisms (mentioned by 8, 6, and 7 out of 17 fishermen, respectively).

In general, during half of the interviews fishers expressed a lack of information sharing activities (I2) concerning the work of the FMO. The interviewed fishermen especially missed transparency regarding the use of their payments for licenses and the member fee. The perception of embezzlement of monetary resources through the FMO was shared among fishermen in different communities both at the eastern and the western shore of the lake. The paucity of available information led on the one hand to the spreading of rumors among fishers, e.g. that project funds for investments in fishery management were solely distributed among responsible persons of the FMO administration, and on the other hand decreased the legitimacy of the co-management regime ("They do what they want, e.g. we tell them what we need, but it depends on what they want to do", fisher_16). However, fishermen generally acknowledged the respective upward accountability of the FMO towards the ministry and accounted for limitations that were imposed on the FMO and constrained their potential actions. The lack of transparency was contested in statements of other actors, e.g. in interviews with governmental authorities and international organizations as well as in EUROFISH MAGAZINE (2012), where the transparency and performance of the FMO in terms of information provision were complimented. Besides the point of transparency, power inequalities with implications for fishing activities became apparent during the interviews. Even though the Management Plan (2004) transferred the ability to monitor the performance of the FMO to state inspectors, interviewees acknowledged that bribing activities took place and the advantageous position of friends of the FMO or influential individuals, leaving behind the notion that "the big people,

the big fish have everything for themselves" (fisher_16). Comparing the legally defined roles to statements from interviews, particular power inequalities between the position of fishermen and (a) friends of the FMO management board, (b) politicians, and (c) FMO management board itself were reported, resulting in a mismatch of assigned positions and opportunities to act. This mismatch that developed through power inequalities became evident in the ability to bypass regulations, a fact acknowledged by state authority, scientists, NGOs and fishermen alike ("we can report [illegal fishing], but they don't do anything, because the ones who fish illegally pay they others", fisher_2).

Although reproaches regarding the lack of accountability of decision-making authorities, e.g. related to the acceptance of bribes, were frequently brought up, fishermen experienced a lack of power and opportunities to influence collective-choice processes (GS6.2, I3). The identified lack of transparency and power inequalities were closely linked to the level of participation of fishermen within the decision-making process. According to the collective-choice rules (GS6.2) on which the FMO structure is based, the elected representatives of each fishing community act in the interest of the fishermen and have the ability to set down the chairmen of the FMO during elections. However, two fishermen and a state inspector declared that these elections took place among responsible persons within the FMO itself without the participation of the fishermen or their representatives during the last years. Interviewees affirmed that *de facto* participation of fishermen in the co-management regime at Lake Shkodra was low. Due to a lack of regular meetings where deliberation processes (I3) regarding the state of the governance regime and information sharing activities (I2) could take place, the accountability of the authorities was further reduced in the viewpoint of the interviewed fishers. "[Only] during elections", and "when we have to pay the license" (fisher_11) was the dominating answer from 11 out of 17 fishermen when asked about the frequency of meetings with the FMO board. Though fishermen stated that "it would be better if we could join in the discussion" (fisher_9) about management objectives and according regulations, expectations of fishermen towards the FMO mainly related to the provision of marketing structures and social security.

In contrast to the endorsement of the legal operational rules for fisheries, contradictory positions of stakeholders were identified regarding the general support for the FMO management board. Governmental authorities, international and national NGOs as well as interviewed scientists approved the structure of the FMO and ascribed full support of the fishermen towards the FMO. Contrary to the identified low levels of downward accountability, unidirectional upward accountability from the FMO to higher authorities was reported to be mainly ensured through the legal framework (through A6.2.3 as constituted in GS4, GS6.3) and reflected in the expressed trustworthiness governmental representatives towards the FMO ("They do their best against illegal fishing", natGov_1). However, the approval towards the FMO was not attested by the fishermen ("We had to come to good terms with [the FMO], because that is how it works here" fisher_6).

The leadership of the FMO denoted achievements in the establishment of strong networks (A6.2) and interpersonal trust (A6.1) towards the FMO members. In order to build-up "reciprocal trust" (FMO_1), the chairmen of the FMO recognized the prominent role that the provision of transparent information to the fishermen had in this regard. However, the interviewees of the FMO management board affirmed to not feel in the position to improve their downward accountability towards the fishermen, because "the state decides everything" and "they do what they want" (FMO_2) without providing sufficient information towards the FMO, e.g. regarding the allocation of funds. Downward accountability of the ministries towards the FMO was therefore regarded as low from the viewpoint of the FMO – a point that national authorities attributed partly to the changes in governmental structures following the elections in July 2015. Nevertheless, the stated lack of downward accountability was also related to general aspects of political (in)stability (S3): interviewees from state and regional level actor groups expressed the difficulties arising through changes in expert or authorities positions following elections, where "militant people" enter in the decision-making process. These political mechanisms related to the distribution of power, corruption, and the inability of less powerful actors to influence the situation were often brushed aside by respondents as "Albanian mentality" and were found to represent a structural problem feeding into the social context of the focal SES Lake Shkodra. With regard to the focal appropriation action situation and the wider social, economic and political setting, a lack of professionals/experts in responsible positions in the past and the perception that "this are not really experts, [...] and they just [...] try to take some money" (sci_2). During interviews, fishermen, authorities and (inter-)national NGOs alike criticized that the biological data (insufficient monitoring activities I9 and subsequent evaluation, I10, uncertainty about RU5 and RS5, RS7) as basis for operational rule generation had been insufficient so far, and illustrated that along with the deficiency of experts in decision-making positions, the legitimacy of the management system was adversely affected.

The information exchange facilitated through bridging and linking ties (A6.2.2 and A6.2.3) was found to be overall weak in the appropriation action situation at Lake Shkodra, as affirmed by interviewees. Collaboration of scientists and the FMO management board was irregular and mainly unilateral in the frame of projects. Also, the linking ties between the MARDWA and the FMO were reduced due to political reasons, as one interviewee stated. Similar difficulties were encountered for bridging ties among the different responsible ministries, as coordination and incentives for cooperation were reported to be missing. Incomplete definition and assignment of responsibilities as well as insufficient communication among the ministries in charge (A6.2.2), leading to overlapping jurisdictions in both the MoE and the MARDWA, were reported as reasons for low levels of downward accountability of the national authorities towards the FMO.[24]

[24] Recently, networks for exchange have been set up in the frame of an EcoNord subgrant for the Albanian

Regarding the third aspect of social fit, the operational rules in place at Lake Shkodra were found to partially misfit the particular conditions of scale. At the spatial scale, all actors stated that there were no restrictions to fishery and the "lake is for everyone" (sci_1). However, during interviews fishermen frequently expressed conflicts in harvesting situations (I4), where the proximity of hooks and nets causes entanglements – a precarious situation mentioned several times by fishermen especially from the eastern shore. Institutions failed in addressing this problem, spatially explicit regulations were not in place. This example addresses social fit in a twofold perspective in that, firstly, participatory mechanisms were not sufficient to provide space for conflict resolution processes, thus leaving behind a sphere of helplessness, because "nothing is done" (fisher_1) and as a consequence trust in the positive impact of the FMO was undermined. Secondly, the heterogeneity of the group of stakeholders at the local level (A3) was not accounted for in the institutional frame for fisheries. This heterogeneity, which was also addressed through the differences among the fishermen from the eastern and the western part of the lake, added to the particular requirements that the subgroups of fishers and their communities showed, e.g. concerning the availability of alternative income opportunities. The last aspect of spatial scale was found with regard to the transboundary context of Lake Shkodra. Despite the targeted resources are highly mobile, rules-in-use for exploitation and protection differed between the riparian states and interviewees highlighted their concern about the diverging legislations.

The transition process from centralized, state controlled management during communist times towards a co-management regime with the FMO as legal resource user association is associated to fit at the spatial scale and at the temporal scale alike. The introduction of Fishery Management Organizations in 2002 followed an Albanian-wide scheme (spatial scale) of institutional structures that did not relate to the local experiences of resource users, of which many were substantially influenced through 40 years of communism and the following quasi open-access situation (temporal scale, see Chapter 4.1 for details), as became evident during the interviews. In that the institutional design did not explicitly address local experiences and expectations, interviewees reported a high amount of illegal activities following the introduction of the FMO at Lake Shkodra – an experience which again affected levels of interpersonal and institutional trust, accountability and legitimacy and eventually impacted users incentives for voluntary compliance.

5.4 Accounting for Ecological Outcomes

In a coupled human-environmental system, outcomes not only refer to the social realm but are equally present for the ecosystem as such. Against the background of the main sustainability

Forum of Shkoder Lake (A6.2.2), bringing together local residents, state inspectors, regional administration authorities, NGOs and scientists. Online information http://www.alcdf.org/econord-r1-39.php (last access March 10, 2016).

question that emerges through the actors' current behavior within the appropriation action situation, attention is directed towards the ecological outcomes of resource exploitation. At the time of the study, data from biological monitoring activities (I9) was rather scarce concerning the impact of fishing activities on fish stocks.[25] As one interviewee noted, the studies conducted so far "had been mainly repeating each other, but real monitoring of fish in the lake has been missing" (natNGO_2). In the attempt to account for ecological outcomes of the SES, mainly qualitative data were available, limiting the ability to verify information reported during interviews or stated in reports.

Throughout the interviews, most actors stated declining catch rates for carp and bleak, yet a recent study evidenced sustainability for the bleak population at Lake Shkodra (SIMIĆ *et al.*, 2015). The uncertainty about the predictability of the system and the state of the resource stocks (RS5 and RU5) was found to aggravate the shortage of viable information as basis for fishery management regulations, e.g. closed seasons or length-based regulations. Monitoring of the effect of these formal regulations (GS6.1) on fish stocks was missing, thus measures relied on experience and tradition (expressed in GS6.1 and GS8, influenced through A7). Deficiencies in the collaboration between scientific institutes and decision-making authorities (GS5) was reported and further hampered information sharing activities (I2) needed for an informed evaluation (I10) of the current status of fishery (lack of bridging ties [A6.2.2] among actors). Particular nature conservation measures related to the control of fishing activities were not apparent at the time of the study. Since extensive monitoring mechanisms for were limited and mainly constrained to avifauna – a fact widely acknowledged by scientists and NGOs – ecological effects of the regulations that came along with the proclamation of Lake Shkodra as Managed Nature Reserve were not determined.

Declining catch rates were mentioned by some fishermen in conjunction with increased numbers of licensed and unlicensed fishermen, particularly at the eastern shore, and with the use of illegal, unselective fishing methods, e.g. electric generators, surrounding nets with small mesh sizes, as well as with the pollution through the aluminum plant in Montenegro (A7, ECO3). Illegal fishing methods as threat to fish stocks were also mentioned in project reports or assessments, e.g. the Transboundary Diagnostics Analysis conducted through ROYAL HASKONING (2006), or the assessments by DEDEJ *et al.* (2010) and PEVELING *et al.* (2015) as threat to the ecosystem Lake Shkodra. In contrast to the perception of declining stocks, some fishermen also reported higher catch rates for 2015, explained through "[...] nature, maybe the weather. We don't know what exactly happens in the lake" (fisher_8). With regard to the ecological outcomes, the transboundary context of Lake Shkodra is of particular importance, as e.g. fishing efforts in either riparian state impact the status of resource stocks in the lake. Though the system boundaries for the analyzed action situation were set at the

[25] An international project aims at harmonizing and implementing biological, physical and chemical assessments with the EU Water Framework Directive, see PEVELING *et al.* (2015)

Albanian part of the lake, the dynamics arising through the transboundary status need to be taken into account as flows into and out of the focal SES (ECO3).
Summarizing the ecological outcomes resulting from interactions in the focal appropriation action situation, little reliable data can be provided here. Nevertheless, the link between social and ecological outcomes was highlighted to account for the feedbacks among the systems also in the transboundary context and emphasized the importance of considering social and contextual factors when paving the way for sustainable resource use and a subsequent long-term protection of ecosystems and resources.

5.5 Synopsis of Findings for the Focal Action Situation

A summary of the social outcomes described for the focal action situation reveals that particular variables of the SES framework were present in all three identified outcomes (see also Table 5.1). For the micro-level outcomes of (perceived) compliance, the likelihood of self-organization and social fit, the interactions of variables related to institutions (GS6) and norms (GS8), actor's past experiences (A3) and the second- and third-tier variables of social capital (A6) were of major importance. Additionally, historical continuity regarding the governance system (GS10) and the current management strategy (GS4) as well as the number of actors (A1), the presence of key actors (A5), prevailing mental models (A7), and user's dependency on the resource (A8) were identified as relevant variables shaping the outcomes through their particular interactions. Acknowledging the wider social and political context (S3) in which the action situation is embedded was particularly important at Lake Shkodra, as the social system was found to be substantially influenced through the post-socialist background and recent national developments. The socialist regime, its collapse and years of economic crisis had affected the agency of the actors at Lake Shkodra for decades and still shaped the mental models and attitudes towards the management regime. The interplay of the above mentioned variables showed a spatial distinction of attributes related to fishermen from the eastern and the western shore. This was expressed in the alignment of mental models and norms among members of a community, their social networks and trust expressed towards each other. Little attempt to overcome communicational barriers through opportunities of (information) exchange was reported, neither related to the actor group of fishermen nor concerning vertical linkages among other groups of actors, e.g. international organizations, state authorities or NGOs. Vertical networks center around the FMO, which, as form of community-based association, represents the fishermen and therefore acts as intermediary between the fishermen and other actors. However, the connection of fishermen to other actors was limited, as direct inclusion, e.g. in projects was generally rare, since mainly the administrative body of the FMO was in the position to act as representative of the fishermen. This particular network configuration of actors was found relevant for the achievement of compliance and social fit as well as the

likelihood of self-organization. Social capital elements of trust and institutions were strongly related through institutional trust, which was reported to be low due to a lack of enforcement capacities related to the operational rules of monitoring and sanctioning.

Table 5.1 – Prominent second-tier variables of the SES framework involved in shaping the social outcomes through interactions and feedbacks at Lake Shkodra.

Variables	Importance
Social, economic and political setting (S)	
S3 –Political stability	Changes in the political system and instability of positions of authorities impedes long-term commitment of actors and involvement for the establishment of sustainable structures at the lake.
Governance System (GS)	
GS4 – Regime type/management strategy	Some co-management structures for decision-making, e.g. the participatory processes, lack legitimacy. Co-management *de jure*, but not *de facto*.
GS6 – Rules-in-use	All actors align with formal rules-in-use (institutional acceptance), but compliance with operational rules is not fully established, the enforcement of monitoring and sanctioning perceived as insufficient.
GS8 – Repertoire of norms and strategies	Corruption and non-compliance with established rules of sustainable resource use negatively feedback on the scope of shared norms and strategies, these are only partially developed at a limited spatial range, mainly in Zogaj.
GS10 – Historical continuity	Past socialist central planning and governance is redirected towards decentralized management in a co-management structure.
Actors (A)	
A1 – Number of relevant actors	More than 400 legal fishers and various other actors are present at the lake. The number of unlicensed fishermen is unknown. The group of resource users is heterogeneous and can be differentiated spatially.
A3 – History or past experience	The communist past and associated experiences shape expectations and actors' mental models. The subjective evaluation of the actual situation and socialist times influences levels of compliance, the likelihood of self-organization and the social fit.
A5 – Key actors	Clear leadership is not established, actors in the respective positions lack full trust, accountability or legitimacy. Key actors that take the lead towards sustainable development are largely unrecognized. Negative consequences of powerful actors who bypass regulations.
A6 – Social capital	Limited trust and networks across actor groups or even within actor groups. Differentiation between institutional and personal trust. Networks of trust limited to well known actors. The configuration of bridging and linking ties restrains communication and exchange of information/knowledge.
A7 – Knowledge of SES/mental models	Resource users share the perception that only stronger control mechanisms would improve the situation at the lake. Ecological knowledge was shaped through daily experiences. The reported state of knowledge differed between actors at eastern and western shore.
A8 – Dependency on the resource	Fishery as only livelihood strategy for many fishermen at the western shore, agriculture as alternative at the eastern side. Strong economic dependency, cultural importance is rather limited, though fishery exists since many generations.

6 Discussion

6.1 Trust, Networks and Institutions at Lake Shkodra

Managing complex systems requires a thorough understanding of the interactions and feedbacks that arise through the configuration of the social and the ecological dimension (LIU *et al.*, 2007; LEHTONEN, 2004). The ability of co-management arrangements to provide the required adaptability in times of uncertainty and enhancement of a system's resilience is widely promoted (FOLKE *et al.*, 2005; LEVIN *et al.*, 2013; CHAFFIN AND GUNDERSON, 2016), yet proper understanding of the social dimension is essential to enable effective collaborative management (PLUMMER AND FITZGIBBON, 2006). At Lake Shkodra, the social dimension of fishery was addressed in the light of social capital. The application of the dynamic SES framework facilitated the analysis of feedbacks among variables and outcomes, which was considered particularly useful to reveal the tight linkages between the cognitive and structural dimension of social capital. In that regard, the elements of social capital, namely trust, networks, and institutions were clearly identified as prominent variables within the analysis of the focal action situation and its particular outcomes. In the following, the importance of the elements of social capital is discussed in the light of the presented empirical data. The attention was directed towards the interactions and outcomes within the appropriation action situation, hence the extraction of resource units. In this regard, the micro-level outcomes rule compliance, likelihood of self-organization and social fit were revealed.
At the level of individual actors, the study revealed the particular influence of mental models, past experiences and the perceived trustworthiness of other actors as factors underlying the behavior and values with respect to fishery. Further, the socioeconomic setting of the individual actor, e.g. the dependence on fishery as source of income was found to influence behavior. At the aggregated group or community level, implications of the individual level related to the experience of fisheries under communism and the degree to which the mental models of different actors overlapped. For the following discussion, the aggregated group or community level that draws on the cognition of the individual actors (JONES *et al.*, 2016) is further examined.

Self-organization and Compliance In common-pool resource dilemmas, institutions regulate the access of users for resource extraction and provide structures that prevent overexploitation by selfish appropriators (VITERI AND CHÁVEZ, 2007). In order to identify conditions for compliance or non-compliance with the institutions underlying the fishery management system at Lake Shkodra, the formal institutional context was related to the implications of the configuration of social capital. The findings of the case study highlighted the interdependence of the enforcement of the rules-in-use, the level of participation, shared norms and the pivotal

role of legitimacy for the actors' decision about rule compliance or violation. Along with this, the constitution of networks and trust enabling corruption was relevant in the context of compliance with fishing regulations at the lake. In line with findings from RAAKJÆR NIELSEN (2003) and VITERI AND CHÁVEZ (2007), compliance was found to be guided by normative and economic incentives as well as experience-driven behavior. The role of shared norms, institutions, networks and trust for shaping incentives and guiding compliant or non-compliant behavior is discussed in the following.

At the level of individual actors, mental models of interviewees revealed their perception that strong regulations were necessary to ensure long-term sustainability of fish resources. In that regard, the protection of the lake and associated regulations were regarded as beneficial also for profitable fishing. The importance of sharing these mental models to facilitate cooperative and compliant behavior was e.g. discussed in MATHEVET *et al.* (2011). Across actor groups, an alignment of the expressed mental models was visible. However, the study revealed overlapping mental models these did not aggregate to shared norms and values at the community level because of weak network ties and high levels of distrust. Therefore, though individual mental models strongly conformed across actor groups and communities, shared norms and cooperative behavior were limited and only found among community members in Zogaj.

The strong cohesive ties among community members in Zogaj provided evidence that network closure (COLEMAN, 1988; GARGIULO AND BENASSI, 2000) fostered cooperative behavior among community members, further strengthened by their dependence on the resources (OSTROM, 2009). In that regard, the common interest of sustaining income during winter was regarded as "trust-producer", where cheating behavior would be observed by the community and would result in (social) sanctions – hence, compliance was at least temporary enforced among participants of the collective fishing activity through an interplay of shared normative understandings, social pressure and the dependency on the resource. In the absence of effective formal institutions that would prevent self-interested behavior through control mechanisms, the combination of shared norms and effective (social) monitoring and sanctioning mechanisms reinforced feedbacks among the levels of interpersonal trust and bonding ties, increasing social capital. However, the cohesive ties that were found to guide cooperation in Zogaj curtailed the exchange of knowledge and information sharing activities with other communities at the lake. Fishermen from Zogaj expressed their concern about negative consequences of information sharing with new fishermen, because improved knowledge about successful fishing might result in economic and social pressure due to a higher number of successful fishers. Hence, limiting the flow of information and knowledge to the defined networks of the "own" community was a means to counteract the (perceived) lack of access controls to fishery at the lake. This spatially confined information exchange however had implications for the adaptive capacities of the fishery co-management in that learning was limited (FOLKE *et al.*,

2005; ARMITAGE *et al.*, 2009). The network configuration in Zogaj is an example for both the positive and negative effects of network closure through cohesive ties, as e.g. discussed by GARGIULO AND BENASSI (2000) and exemplifies the role of networks and trust for collective action (BODIN *et al.*, 2006). The design principles relevant for enabling collective action in the commons (OSTROM, 1990) were mainly reflected for the self-organization in Zogaj during winter. Prerequisite for this temporal cooperation however was the minimal right to organize, which was ensured because other actors (ranging from other fishing communities to administration and state authorities) acknowledged the communities dependence on the catch and their long-time tradition.

Whereas in the community of Zogaj strong bonds and shared norms enabled social pressure and sanctioning of non-compliant behavior even in the absence of formal mechanisms, bonds were not found to be equally strong at the eastern part of the lake. Particularly challenging at Lake Shkodra was the rather selfish behavior and short-term thinking that was attributed to actors without fishing tradition and commitment to the lake, e.g. new fishermen that migrated from other parts of Albania to the area. The lack of trust that was found among fishing communities at the eastern side of the lake was attributed to these new actors. Informal institutions that guide fishermen's behavior were not equally respected, e.g. in that fish and gear got stolen frequently. As a consequence, interpersonal trust among fishermen was eroded and further impacted the trustworthiness that other actors expressed towards fishermen. The role of social sanctioning for compliance was found to be twofold: Firstly, when trust in the complying behavior of others is weak, compliance is further reduced as free-riders impose economic pressure on other resource users fostering the very tragedy that was predicted by HARDIN (1968). The flux of outsiders especially at the eastern part of the lake challenged the establishment of strong bonds which would have allowed self-organization activities, e.g. for the establishment of access controls (BASURTO *et al.*, 2013a). In the absence of strong community bonds and a fear of retaliation, social sanctioning of non-compliant fishers was found to be ineffective at the eastern shore (cf. ACHESON, 1975).

Secondly, KARPER AND LOPES (2014) pointed out the importance of societal pressure as incentive for complying behavior. However, as networks among fishermen especially in the East were found to be of limited dimension (spanning families/kinship and close friends), social influences (e.g. through societal pressure or reputation) and incentives for compliance were not sufficient in the absence of strong enforcement of formal monitoring and sanctioning mechanisms. Instead, interviewees reported non-compliant behavior by licensed fishermen, e.g. through the use of restricted fishing gear, the catch of too small individuals or fishing during the closed season. Watching others non-compliance led to the perception of unfairness and impeded the establishment of shared norms and incentives for compliance (cf. KARPER AND LOPES, 2014). Moreover, the notion that effective monitoring and sanctioning mechanisms were thwarted through corruption intensified the perceived unfairness resulting in

an increased demand for regulation. The government failure that DIMITROVA-GRAJZL *et al.* (2012) attributed to the interplay of corruption and the demand for regulation aligned with the expressed attitudes of actors at Lake Shkodra. Though the number of sanctioned violations had been increased throughout the last three years, the costs of external rule enforcement were high because it solely relied on the formal detection and sanctioning of non-compliers through inspectors/guards. COOKE *et al.* (2013) pointed out, that strengthened social sanctioning mechanisms (e.g. peer pressure) would be likely to decrease the otherwise costly enforcement of formal monitoring and sanctioning regulations. Especially in the context of fishing activities at Lake Shkodra, the limited capacities of the FMO with regard to effective monitoring and sanctioning would benefit from enhanced informal (social) institutions.
The analysis of feedbacks and interactions among the micro-level outcomes of compliance and self-organization highlighted the role of networks and trust: levels of compliance were influenced through bonding ties (shared norms, social sanctioning) that would also establish capacities for collaboration, as found in Zogaj. Yet, distrust among members of the same community and across fishing communities impeded the establishment of network ties, feeding back on incentives for rule compliance, individual values and models. These findings on the interplay of the elements of social capital concur with literature on collective action and collaborative management as well as social capital in the context of natural resource management (LUBELL AND SCHOLZ, 2001; BODIN AND CRONA, 2008; OSTROM, 2007b).

Social fit For social fit with stable institutions to emerge, an alignment of the normative values held by the respective actor groups and the formal institutional setting is a main requisite (EPSTEIN *et al.*, 2015), linking the individual and the aggregated community level in the action situation. For fishery at Lake Shkodra, social fit was associated with the legitimacy and accountability of actors and the management system, affected by the actors' opportunities to participate in the decision-making process. The perceived lack of enforcement of the fishery regulations by authorized persons reduced the legitimacy that fishermen attributed to the co-management system. Besides the lack of enforcement, opportunities to participate were influencing the level of legitimacy and thus the motivation of stakeholders to comply with regulations – a correlation also supported by VITERI AND CHÁVEZ (2007). In contrast to the viewpoint of NGOs, state authorities and international actors, fishermen did not address participation as a means for management success, since their current participation in the FMO only involved the distribution of licenses, election of representatives and irregular meetings. Instead, fishermen rather emphasized the need for stronger controls that would ensure proper monitoring and sanctioning of non-compliant behavior. Therefore, from the viewpoint of the interviewed fishermen participation was not regarded as priority element of fishery management. Thus, the co-management exhibited a "participatory misfit" (DECARO AND STOKES, 2013), where the implemented opportunities for participation did not meet the

demands of the targeted stakeholders. This situation had implications for the achievement of social fit within the appropriation action situation: the plea for stronger rule enforcement, as demanded by fishermen on the one hand, and the devolution towards co-management under the responsibility of the FMO at the other hand, were regarded as two diverging concepts in need for integrative deliberation processes to reach common understanding. Given the pivotal role of appropriate participation in co-management arrangements, e.g. by facilitating learning, the congruence of the structural and cognitive dimension of social capital is required for building adaptive and resilient systems (e.g. LEBEL *et al.*, 2006; PRETTY, 2003).

In their study, DECARO AND STOKES (2013) used "institutional acceptance" as indicator for the legitimacy of a management system and hence social fit, and further identified acceptance as proxy for the actors' motivation to be concerned with environmental stewardship in the wider sense. For Lake Shkodra, the perception of institutional acceptance was found too narrow to serve as indicator for social fit. Interviewed stakeholders across actor groups at Lake Shkodra confirmed their acceptance with formal regulations for fishery management and nature conservation (which would have implications for fishery e.g. through the establishment of no-take zones) but found fault with the enforcement mechanisms as outlined previously. Notwithstanding the expressed institutional acceptance, actors contested the legitimacy of the management system and the legitimacy of experts and authorities for fishery at Lake Shkodra. Reasons for the expressed lack of legitimacy were found in the low competence-based trust towards experts and authorities, a shortage of reliable ecological data informing the decision-making, corruption and low downward accountability of the FMO. Among these reasons, previous research showed that particularly competence-based trust is associated with networks of information and knowledge exchange and facilitates learning (LEVIN, 2004), affecting the adaptive capacity of the governance regime (FOLKE *et al.*, 2005). The importance of weak (GRANOVETTER, 1973) or bridging ties facilitating knowledge transfer among actor groups was also stressed by GRAFTON (2005) in the fisheries context. At Lake Shkodra, gaps within the actors' network hindered the exchange of information about needs and expectations, aggravating negative perceptions from fishermen towards authorities, as their wishes and needs were not accounted for. As "structural holes", these gaps would provide the potential for beneficial brokerage and represent a future advantage rather than a barrier (BARNES *et al.*, 2016). The position of brokers was formally associated with the representatives of the fishing communities. However, since their role in networking activities was rather minor, benefits of these bridging positions in facilitating information flow and increasing communication along the hierarchical gradient of actor groups (e.g. state authorities, FMO and fishermen) remained largely unused.

Trust at the individual level and trust in institutions were identified as important factors influencing the actors' behavior at Lake Shkodra and essential assets where sufficiently established. As in the case of the fishing community in Zogaj, the expressed trust among

members of the community positively influenced the reported levels of compliance and led to temporal self-organization of fishing activities during winter months. The high amount of interpersonal trust in Zogaj stems from the strong bonds existing between the community members, permitted because of the small community size that allows frequent communication and exchange with all members. Through these networks of trust an environment of reciprocity was established that contributed to the generation of social capital (LUBELL AND SCHOLZ, 2001). Moreover, social fit of the actors' needs and the institutions is greater in Zogaj due to the informal rules that suit the particular requirements of cooperation. The characteristics of the fishing community of Zogaj align well with findings from collective action research, where strong bonds in a mainly homogeneous group of small size with common interest enable collective action for solving social dilemmas (AGRAWAL AND GIBSON, 1999; ROTHSTEIN, 2000).

Following HOLLAND (1998), there is a need to transform the "vicious circle of distrust" to a "virtuous circle of trust – at the institutional scale as well as regarding the trust relations among the actors at local, regional, and national level. Regarding interpersonal trust among actors at Lake Shkodra, the difference in the levels of trust among fishermen within their community and their perceived trustworthiness of fishermen from other communities at the eastern and the western shore, respectively, remained largely unattended in the view of other actors, e.g. the FMO, state authorities or NGOs. In general, fishermen were treated as homogeneous group of resource users, discriminated only through the dependency on fishery as livelihood strategy. The experiences during communism and the occupation with fishery alone however were not able to establish incentives and motivation for collective action among actors at Lake Shkodra, and differences emanating from the socioeconomic context (relation to key actors, community membership, dependency on fishery) remained (BIGGS *et al.*, 2011). The discord of general institutional acceptance on the one hand, and a lack of their enforcement through community values as well as formal processes on the other, feed back on the levels of institutional trust, which again is influenced through the perceived effectiveness of monitoring and sanctioning measures. In other words, the task identified through the analysis of the action situation is to turn institutional acceptance into institutional trust, which could facilitate the establishment of stable rules-in-use and therefore again build up trust through the effectiveness of those very rules-in-use, ultimately enhancing social fit.

The analysis of trust relationships of actors at Lake Shkodra was also related to the perceived levels of up- and downward accountability of actors. The accountability of monitoring and sanctioning authorities (COX *et al.*, 2010) was curtailed by issues of corruption and transparency and the underlying adverse impacts of trust and networks. As also discussed by SUNDSTRÖM (2013) and ROBBINS (2000), corruption had twofold implications for social capital: on the one hand, trust among the bribing parties was needed (trust in that the expectations of both actors are met) and bonding ties in order to facilitate corruption. At the other

hand, knowledge about corruption negatively affected the accountability of authorities and undermined interpersonal trust at local, regional and national level – aspects which again affect the perceived governance failure along with the demand for stronger regulations (cf. DIMITROVA-GRAJZL *et al.*, 2012). The trustworthiness of authorities was further influenced through the lack of transparency. The weak networks among different actors and largely absent bridging actors, able to navigate the information flow e.g. from the FMO to fishermen, corroded the perceived accountability of authorities towards resource users. Missing connections at the vertical social scale, connecting the local, regional and national level, effected the upward as well as downward accountability of actors (MEINZEN-DICK AND KNOX, 1999). Corruption and transparency as manifested in the levels of expressed accountability and legitimacy ultimately fed back on the behavior of actors in the fishing activity, thus influenced the incentives for compliance or non-compliance with formal regulations. The link between the perceived legitimacy of institution and the levels of voluntary compliance, as e.g. established by PINKERTON AND WEINSTEIN (1995) and ARIAS *et al.* (2015), was found to be particularly important in a context where capacities for rule enforcement are limited, as is the case at Lake Shkodra. The tight linkages of variables related to the structural and cognitive dimension of social capital and the actors' behavior came apparent here and underlined the notion that fit can only emerge when the motivation of actors and the aim of the governance arrangement align (VATN, 2001).

Various authors address the importance of the scale for achieving SES fit (e.g. EPSTEIN *et al.*, 2015; WIBER *et al.*, 2004; HARKES, 2006). Findings of the study at Lake Shkodra support the essential role of scaling processes in three dimensions: the social, spatial and temporal scale. Regarding the social dimension, scaling from the constitutional to the operational level, hence the establishment of links between the national, regional and local level, and the need for nested governance structures against the background of decentralization were previously stressed (e.g. in ANDREW *et al.*, 2007). The identified gaps in the vertical actor network, e.g. regarding information exchange between national authorities and the fishermen, revealed the need for an improved polycentric approach which particularly guides the transition from centralized to decentralized co-management, as stressed by ANDERSSON AND OSTROM (2008) and KLUVÁNKOVÁ-ORAVSKÁ *et al.* (2009). The scale aspect at Lake Shkodra is further related to its transboundary characteristics which impose particular challenges on a fitting management for fisheries: regarding the role of social capital in the transboundary context, LEONARD (2008) highlighted the importance of the social networks that facilitate cooperation and exchange in a study on transboundary fisheries management at the Laurentian Great Lakes. Though the transboundary aspect had been only marginally addressed in the study at Lake Shkodra, challenges arising through the mobile resources, the harmonization of the fishery legislation, revision of system boundaries and transboundary impacts of externalities in either riparian state (i.e. pollution of the lake by the former Montenegrin aluminium plant,

PEVELING *et al.*, 2015) were revealed as areas of concern for fisheries at Lake Shkodra that require social capital. Besides aspects of social and spatial scale, the aspect of temporal scale (VATN AND VEDELD, 2012)[26] accounts for the particular implications of the communist past and the transition towards market economy. Enhancing social fit requires the integration of the path dependency of the management system and the past experiences that shaped the actors' cognition. Given the lack of experience in participatory processes in many post-socialist countries (RODELA AND UDOVČ, 2008), the setting up of effective collaborative management likely requires different time scales. Related to the temporal scale of social fit, implications of the post-socialist context for social capital are further discussed in the following.

Social Capital and the Post-Socialist Context Besides the role of social capital in general, the case study at Lake Shkodra elaborated the role of the Albanian post-socialist context for the particular appropriation action situation. Interviewees' references to communist times or the years of turmoil in the late 1990s revealed the relevance of the past experiences for fisheries. Most interviewees experienced both the time under full state-control and the anarchy-like situation that threw back the country's positive development after the collapse of the communist regime and thus have a common history. However, what interviewees described as "Albanian mentality" needs to be considered without assuming "moral relativism or cultural determinism" (PRATO, 2013, p. 198). Weak social capital is not solely found in former communist countries (e.g. corruption, low levels of trust and rule compliance, cf. ROTHSTEIN AND USLANER, 2005 and HOLLAND, 1998).

Nevertheless, the decades of state control impacted the social fabric in that bridging ties were mainly absent and bonding ties only partially developed among family members and close friends, in line with findings of STANCIU AND IONIŢĂ (2014) and ROSE-ACKERMAN (2001). The former quasi omnipresent state control ensured the enforcement of regulations, so that a need for more informal monitoring and sanctioning mechanisms through community members did not evolve. The connection of the past experiences with state authorities and the formerly limited networks among fishing communities has implications for the situation at Lake Shkodra today at various dimensions. During communism, the collectivized fishery was implemented through the central government and entailed very limited collective action of stakeholders. Because only "pseudo cooperatives" (THEESFELD AND BOEVSKY, 2005, p. 178) were established, a history of self-organization and experience in the establishment of congruent rules-in-use is missing. The missing background in participatory processes that could help to facilitate conditions for collective organization was revealed as second aspect related to the post-socialist context of the SES Lake Shkodra, that can be attributed to the socialist background, in line with findings from SZABO *et al.* (2008). GATZWEILER AND HAGEDORN

[26] The temporal scale is also related to ecological processes and ecosystem characteristics, e.g. fish migration, yet out of the scope of this study.

(2002) highlighted the difficulty of aligning new institutions, as e.g. stakeholder participation in the fishery co-management regime in the case of Lake Shkodra, with the acquired practice needed to implement these – where the lack of experience with organization and participation might hinder the successful implementation (cf. JANSSEN AND OSTROM, 2001 on importance of organizational experience). Case studies on participation in natural resource management emphasized the need for accountable and legitimized leaders that facilitate and coordinate cooperation during the institutional transformation towards decentralization and provide opportunities for knowledge exchange (e.g. through brokerage) and learning (ULAMBAYAR, 2015; GUTIÉRREZ *et al.*, 2011; KLUVÁNKOVÁ-ORAVSKÁ *et al.*, 2009).

Increased corruption after the fall of the communist regime (LAWSON AND SALTMARSHE, 2000)[27] influenced the perceptions and evaluations of stakeholders regarding the effectiveness of the centralized and decentralized management regime. As for the focal appropriation action situation, corruption undermined the effectiveness of regulations, i.e. individuals escaped sanctions for rule violation by their relations to actors with monitoring and sanctioning authority. As apparent in the interviews, this behavior involved strong ties to authorities in charge of control, so that mainly powerful actors profited from illegal activities enabled through corruption. SCHMIDT AND THEESFELD (2012) reported extensive elite capture in the Albanian Lake Ohrid fishery sector as remnant of a lack of trust and unequal distribution of power. At Lake Shkodra, this kind of petty and grand corruption (SUNDSTRÖM, 2013) at the local as well as the state level was perceived as detrimental to the sustainable resource use in the eyes of the all interviewees, reducing accountability and trust in institutions and individuals alike. Moreover, a second layer of bribery was identified that rather involved a normative system of informal "exchange of favours" (PRATO, 2013, p. 208), often associated with post-communist countries (PALDAM AND SVENDSEN, 2001; USLANER AND BADESCU, 2004). Instead of the perception of a strong and trustworthy state, able to provide equal conditions through the enforcement of regulations, resource users and other actors relied on bribery to work out personal benefits in the uncertain environment of transition from central to decentralized management.

Low levels of institutional trust at Lake Shkodra align with findings for other post-socialist countries (see e.g. ROTHSTEIN, 2000). Besides low institutional trust, however, interpersonal trust was equally weak among actors, except for the community of Zogaj. Trusting relationships during communism had been limited to family bonds and close friends at Lake Shkodra and were found to remain in the context of fisheries.

Implications of Social Capital for the Ecological System Regarding the ecological outcomes, the high degree of uncertainty set constraints to their reliable assessment. However,

[27] Compare to findings in PRATO (2013), who indicates that already during "1976-86, following Albania's economic autarky, corruption became widespread at all levels of the State's insitutions" (p. 200).

the interdependence of the actors' dependency on the resource, their values and attitudes and the perceived risk of overexploitation was observed. In the data-poor condition at Lake Shkodra, the behavior of fishermen was related to their perception of the state of fish stocks. Illegal activities and non-compliant behavior were valued normatively by the actors, scientific data that assessed the relation between rule violation and the condition of fish stocks was missing. Thus, the relation between the social and the ecological system regarding fishery at Lake Shkodra remained largely unclear, e.g. if the number of actors currently present at the lake is detrimental for the ecological system or if the stock is able to support the number of fishermen on a sustainable basis. Fishers as main resource users at the lake are in the position to substantially contribute to the generation of biological data, e.g. through reporting of catch rates. Good knowledge about the resource to be governed is regarded as asset for the achievement of social as well as ecological – and ultimately social-ecological – fit, leading to viable fish stocks and viable communities alike (JENTOFT, 2000b) enhancing the adaptive capacity of the management (FOLKE *et al.*, 2002).

6.2 Implications of Social Capital for Fisheries at Lake Shkodra

The introduced co-management regime that brought along the institutional shift from state authority to local collaboration is one possibility to account for the tight linkages among the ecological and the social realm. Despite the vast evidence of the success of collaborative management approaches, these arrangements are not free from failure when local conditions are not met (CHUENPAGDEE AND JENTOFT, 2007). In order to enhance the social outcomes of the co-management regime at Lake Shkodra, investments in better communication and networking structures are needed, which would also benefit the levels of trust among actors and thus would eventually enable the building up of stable social capital over time. A special focus in this regard should be directed towards the competence-based trust (HATCHER *et al.*, 2000), that would further support the legitimization of actors in decision-making positions. It would positively affect the dissemination of information, social learning and knowledge sharing against the background of sustainable resource use and in that sense deliver benefits for fishermen (knowledge of the resource, social fit of the management system) and decision-making authorities alike (e.g. ecological information through reliable catch statistics, accounting for needs of fishermen increases levels of compliance).

The improvement of trust relations can be accomplished either through stronger rule-enforcement and coercive measures that affect the levels of institutional trust, or via networking activities targeting interpersonal trust relations. In the light of cooperation for resource protection, RAYMOND (2006) stressed the role of coercive measures in enabling cooperation in the absence of trust. However, strong enforcement mechanisms are needed to substitute for trust among actors and ensure compliance and cooperation. The substitution of trust through

coercive measures is not feasible at Lake Shkodra, e.g. because of the costs associated with full enforcement in the absence of social mechanisms. Instead, an improvement of social capital would benefit the legitimacy of the system and provide incentives for rule compliance and cooperation. Although the study put strong emphasis on the role of social capital for the co-management of fisheries at Lake Shkodra, the potential benefits of central management should be acknowledged, especially in the light of the positive association with state management in communist times. However, the positive association of fishers with state control during communism contrasts to the distrust in state authorities today. Given this distrust, a focus on empowerment at the local level seems more viable for achieving long-term sustainability at Lake Shkodra. Social capital could therefore complement the institutional arrangements underlying the management system (YANG, 2008).
Besides the role of social capital and coercive measures, users' (economic) dependence on fishery needs to be taken into account. Providing alternative income opportunities could reduce the number of actors and positively affect the level of voluntary compliance (ARIAS *et al.*, 2015). Likewise, the implementation of a marketing scheme with additional processing could allow for diversification of income options in the communities. The development of nature-based tourism might offer alternative employment as well, however the demand for fish in local restaurants could counteract the attempt to reduce the dependence on fishery.

6.3 Methodological Considerations

Besides the results of the empirical data discussed above, some limitations of the methodological approach in general are acknowledged in the following. These arise, on one hand, through the application of the SES framework as diagnostic tool for the analysis, and through the collection of empirical data on the other.

Use of the SES Framework For the study at hand, emphasis was placed on the qualitative analysis of social outcomes in the light of trust, networks and institutions. The use of OSTROM's SES framework facilitated the analysis of dynamic feedbacks and interactions among the identified variables. Incorporating common-pool resource theory, collective action theory, and the concept of social capital at different levels into the nested structure of the framework was perceived as particularly beneficial in order to delineate the focal appropriation action situation at Lake Shkodra. Though the integration of the ecological sphere for in-depth understanding of SES is emphasized in the literature (EPSTEIN *et al.*, 2013; OSTROM, 2007a), the limited availability of ecological data from secondary sources reduced the ability to integrate this knowledge into the analysis. Because of the paucity of data, deducting implications that arise from interactions of the social and the ecological system was mainly limited to the normative and subjective view of actors expressed during interviews, e.g.

regarding declines in stock sizes of commercial fish species. However, as for data-poor systems, e.g. JOHANNES AND NEIS (2007) and ROCHET *et al.* (2008) stressed the usefulness of resource users knowledge and perceptions about the state of the resource.

The introduction of new variables which were not part of the set provided in the latest amendments (MCGINNIS AND OSTROM, 2014) followed the proposed formalization of HINKEL *et al.* (2014). Against this background the initial separation of horizontal and vertical networks (BERKES, 2004b) was still accounted for in the analysis of networks regarding bonding, bridging, and linking ties. The discussion about the interplay of horizontal and vertical networks by BRONDIZIO *et al.* (2009) underlined the importance but yet complexity of networks especially with regard to the study of social capital. Expanding the aspect of networks from an institutional context to relations among individuals demanded the positioning of networks as lower-tier variable as it referred to the structural dimension of social capital.

The diagnostic procedure applied in the study at hand used the "symptoms", hence the outcomes of the system as starting point to which important variables where assigned and feedbacks among the variables identified. In this regard, the establishment of causal relationships, which was discussed as one of the challenges of the framework by NAGENDRA AND OSTROM (2014), had been attempted. Given that various feedbacks among variables from the ecological and the social system result in non-linear relations, the attribution of causality to single variables which could then serve as leverage point for change was perceived as delicate. For the purpose of the analysis, evaluation processes and decisions at the operational level were related to the context of available information and the particular time frame that actors were able to assess. For example, the legitimacy of the management system was weak because actors were able to compare the performance of former state-control with the present situation. Individual mental models, shaped through these available information, contributed to the dynamic nature of the resulting feedback loops across time scales. Through accounting for time-related feedbacks, e.g. by integrating past experiences of actors, the use of the SES framework was particularly useful for the study of social capital in a post-socialist context.

The use of the diagnostic approach for the application of the SES framework facilitated the identification of interacting variables and their respective feedbacks relevant for the micro-level outcomes of fishery at Lake Shkodra. The SES framework provided a structured approach to delineate the appropriation action situation within the SES Lake Shkodra. Through linking action situations, micro-level outcomes of interrelated action situations (e.g. at the level of collective-choice or operational rules) were related to the appropriation situation, e.g. aspects of legitimacy and participation as micro-level outcomes of a collective-choice action situation were linked to the micro-level outcome compliance in the appropriation action situation. The usefulness of linking action situations and outcomes was also affirmed by ANDERIES *et al.* (2004) in order to account for the dynamic and complex nature of SES. Furthermore, the concept of social capital proved to be a useful starting point for the analysis of the social

dimension of fishery at Lake Shkodra. However, the universality of the concept bears the risk of overemphasizing its role. Thought needs to be given to a number of additional variables and interactions that relate to the social dimension, e.g. aspects of culture or the socioeconomic dimension.

Data Collection The selection of a mere qualitative approach for the assessment of social outcomes at Lake Shkodra was an opportunity and a challenge at the same time. Through the informal atmosphere which was created with the flexible, open-ended interview structure, topics initially not accounted for emerged in conversations and enabled further in-depth understanding of the action situation. A trustful relation between interviewer and respondent was established at once and eventually contributed to increased levels of reliability of the given answers (HANCOCK AND ALGOZZINE, 2006). Nevertheless, the author acknowledges the difficulty of assessing trust and further normative aspects of the social system in a qualitative approach, especially regarding the comparison of answers among actor groups (STORY *et al.*, 2015). In interviews with fishermen, the question about additional income opportunities was mostly negated at first, so that full dependency on fishing was assumed. However, through the time spent in the field these answers needed to be put in perspective, as some respondents did not see that their small part of land/their cow contributed to their income and reduced their dependency on fishing. Partially, respondent's answers were found to be very subjective and highly influenced through their past (positive or negative) experiences. Interestingly, these subjective responses enabled further understanding of trust relations and social networks concerning the appropriation action situation at the lake, since groups of actors sharing similar attitudes could be identified. The emphasis on the cognitive dimension as an explanatory factor for social capital therefore justifies the choice of a qualitative approach for the particular research interest of this study (cf. GROOTAERT AND VAN BASTELAER, 2002).
Constraints for the data collection are seen in the limited representation of local government actors in interviews. Their role within the management process was found to be limited at the time of the study. This view was supported through interviews, where references to the local government as important stakeholder were absent. Besides, during the time of the data collection extensive re-structuring of responsibilities and competencies took place following the elections from June 2015. Newly introduced structures like the agencies of protected areas at national and regional level were not fully established at the time of the study. Their position would need to be included in future works at Lake Shkodra, as for example activities include actors from the municipality of Shkodra and aim at strengthening their participation in sustainable development.[28]

[28] A first citizen forum took place in March 2016, with representatives of communes, protected area administration and residents of communities around Lake Shkodra (information from REC (2016), available online at Mjedisi Sot).

Since the case study at hand mainly represents a snap-shot of the action situation at the time of the data collection, the selection of interviewees was regarded viable and comprised representatives of the main operating actor groups identified. The question of representation held equally true for the interviewed fishermen. Though approached randomly in the field, a bias towards fishermen who used the interview as chance to express complaints can not be eliminated. The fishermen potentially used the opportunity of the interview to articulate frustration and negative experiences, or answers were led by expectations of the effect of the complaints. Likewise, bias in responses might be found in positive terms, when interviewees were in close relation with other actors, e.g. bonds between individual fishers and representatives of the FMO. In general, responses or expressed perceptions of different actor groups only partially contrasted and no major inconsistencies were identified in the frame of the analysis. Concluding from this, the situation that was depicted by the interviewees at the time of the study was in general perceived similar by all groups of actors, which approved the method of data collection and the quality of the empirical data.

7 Conclusion and Outlook

The analysis of social outcomes of fishery at Lake Shkodra emphasized the role of formal and informal institutions, social networks and (networks of) trust. The empirical data highlighted the limited interpersonal trust among actors along with an equally weak institutional trust, attributed to the lack of enforcement of the rules-in-use. The low enforcement capacities as well as the reported high levels of corruption decreased the legitimacy and accountability that fishermen attributed towards the FMO and respective management authorities. General institutional acceptance for regulations on fisheries as well as for rules associated with the objectives of nature conservation was high and revealed concurring mental models across actor groups. However, shared social norms only emerged in the presence of the cohesive community network structure in Zogaj, where strong bonds, trustful relations and social mechanisms, e.g. social pressure, provided incentives for compliant and cooperative behavior. The implications resulting from the post-socialist context were of particular importance at Lake Shkodra. The mental models, norms and attitudes of the current generation of fishers and other actors was influenced by past experiences, but also need to be considered in the national context of the process towards EU accession. The institutional shift from central management during communism to stakeholder involvement in a co-management arrangement at Lake Shkodra should account for this context and provide flexible and adaptive institutions that align with the local conditions. As long as the actors' cognitions are shaped through the past and the limited experience with participation prevails, those have to be integrated into the considerations of future management options. With regard to rule compliance, HIRSCHMAN (1970, p. 1) notes:

> "*No matter how well a society's basic institutions are devised, failures of some actors to live up to the behavior which is expected of them are bound to occur [...]. Each society learns to live with a certain amount of such dysfunctional or mis-behavior; but lest the mis-behavior feed on itself and lead to general decay, society must be able to marshal from within itself forces which will make as many of the faltering actors as possible revert to the behavior required for its proper functioning.*"

It is therefore important to strengthen incentives for voluntary compliance through trusting networks and appropriate institutions. The establishment of incentives for compliance and cooperation reflects the legitimacy that users assign to the system. Besides the positive notion that social fit accompanies the evolution of incentives for cooperation and compliance, ARIAS *et al.* (2015) emphasized the lower costs associated with voluntary compliance. The incentives necessary for voluntary compliance are found to be immanently linked to trustful relations among members of the communities and stakeholders involved in or affected by the

decision-making process. Theory and practice prove that mechanisms can be developed to halt the increase of misbehavior – often not solely through strong formal sanctioning processes, but through fitting participation approaches that legitimize regulations, foster incentives for compliance and the alignment of regulations with norms and attitudes (GUTIÉRREZ *et al.*, 2011; COOKE *et al.*, 2013; ANDERIES AND JANSSEN, 2013). A leverage point for further sustainable development is attributed to the configuration of bonding, bridging and linking ties among individuals and actor groups, as they facilitate trust-building processes, information and knowledge exchange for the setting of common goals, shape motivation and incentives for participation, compliance, and (self-)organization. In order to strengthen the relevant ties, increased transparent communication between the present actor groups is necessary when following the path of collaborative management. The perception of declining catch rates and a general degradation of the resource system already brought together a variety of stakeholders, e.g. via working groups implemented in the frame of projects or through initiatives like the Transboundary FORUM of Shkodra/Skadar Lake. Establishing a virtuous circle of trust through the exchange of mental models and attitudes in networks, supported by legitimized institutions at constitutional and collective-choice level is decisive for holistic fishery co-management that spans the bridge between the community and the environment and is adapted to the local context.

The analysis of the configuration of social capital was only a first step to take into account the social dimension of actors at Lake Shkodra. The results emphasize the importance of the social dimension for fisheries co-management at Lake Shkodra, indicating that a focus on the network relations and interpersonal as well as institutional trust of actors could leverage successful cooperation for sustainable fisheries management and subsequent long-term resource protection. Investing in revealing the configuration of social capital in that regard informs not only the co-management design, but might facilitate the alignment of stakeholder needs and ecological objectives through appropriate institutions for sustainability. Knowledge about the configuration of social capital therefore could further the improvement of adaptive capacities for the sustainable management of complex social-ecological systems. For effective management, some degree of control is certainly required. However, controlling mechanisms alone will not able to substitute for trusting relations among actors at Lake Shkodra given the distrust towards state authorities. Against this background, the statement of Vladimir Lenin[29] that “trust is good, control is better” should be reversed and highlight that “control is good, trust is better” at Lake Shkodra.

[29] The quote is commonly attributed to Lenin, though evidence about the real origin is missing.

References

AASD, Albanian Association for Sustainable Development (2012). Report on Illegal Fishing Survey 25 June 2012.

Acheson, J., Apollonio, S., and Wilson, J. (2015). Individual transferable quotas and conservation: A critical assessment. *Ecology and Society*, 20(4).

Acheson, J. M. (1975). The lobster fiefs: economic and ecological effects of territoriality in the Maine lobster industry. *Human Ecology*, 3(3):183–207.

Adger, W. N. (2010). Social Capital, Collective Action, and Adaptation to Climate Change. In Voss, M. (editor), *Der Klimawandel*, pages 327–345. VS Verlag für Sozialwissenschaften.

Agardy, T., Bridgewater, P., Crosby, M. P., Day, J., Dayton, P. K., Kenchington, R., Laffoley, D., McConney, P., Murray, P. A., Parks, J. E., and Peau, L. (2003). Dangerous targets? Unresolved issues and ideological clashes around marine protected areas. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 13(4):353–367.

Agrawal, A. and Gibson, C. C. (1999). Enchantment and disenchantment: The role of community in natural resource conservation. *World Development*, 27(4):629–649.

Ahn, T. and Ostrom, E. (2002). Social Capital and the Second-Generation Theories of Collectvie Action: An Analytical Approach to the Forms of Social Capital. pages 1–36.

Akpalu, W., Eggert, H., and Vondolia, G. K. (2009). Enforcement of exogenous environmental regulation, social disapproval and bribery. *Journal of Socio-Economics*, 38(6):940–945.

AKZM, Agjencia Kombëtare e Zonave të Mbrojtura (2015). Development Strategy of PA – Short and midterm strategic program 2015-2020. http://akzm.gov.al/index.php?option=com_k2&view=item&id=125:strategjia-e-zhvillimit-e-zm&Itemid=426&lang=us. Last access 2015-11-20.

Anderies, J. M. (2014). Understanding the Dynamics of Sustainable Social-Ecological Systems: Human Behavior, Institutions, and Regulatory Feedback Networks. *Bulletin of Mathematical Biology*, 77(2):259–280.

Anderies, J. M. and Janssen, M. A. (2013). *Sustaining the Commons*. Center for the Study of Insitutional Diversity Arizona State University.

Anderies, J. M., Janssen, M. a., and Ostrom, E. (2004). A Framework to Analyze the Robustness of Social-Ecological Systems from an Institutional Perspective. *Ecology and Society*, 9(1):1–18.

Andersson, K. P. and Ostrom, E. (2008). Analyzing decentralized resource regimes from a polycentric perspective. *Policy Sciences*, 41(1):71–93.

Andrew, N. L., Béné, C., Hall, S. J., Allison, E. H., Heck, S., and Ratner, B. D. (2007). Diagnosis and management of small-scale fisheries in developing countries. *Fish and Fisheries*, 8(3):227–240.

Anthony, D. L. and Campbell, J. L. (2011). States, social capital and cooperation: Looking back on Governing the Commons. *International Journal of the Commons*, 5(2):284–302.

APAWA, Association for Protection of Aquatic Wildlife of Albania and Center for Ecotoxiological Research of Montenegro (2007). The Strategic Action Plan (SAP) for Skadar/Shkodra Lake Albania & Montenegro. Ministry of Tourism and Environment Montenegro, Ministry of Environment, Forests and Water Administration of Albania.

APAWA, Association for Protection of Aquatic Wildlife of Albania (2012). Përgatitja e planit të mënaxhimit për rezervatin natyror të menaxhuar të liqenit të shkodrës. Report.

Arias, A., Cinner, J. E., Jones, R. E., and Pressey, R. L. (2015). Levels and drivers of fishers' compliance with marine protected areas. *Ecology and Society*, 20(4):19.

Arlinghaus, R., Mehner, T., and Cowx, I. G. (2002). Reconciling traditional inland fisheries management and substainability in industrialized countries, with emphasis on Europe. *Fish and Fisheries*, 3:261–316.

Armitage, D. R., Plummer, R., Berkes, F., Arthur, R. I., Charles, A. T., Davidson-Hunt, I. J., Diduck, A. P., Doubleday, N. C., Johnson, D. S., Marschke, M., McConney, P., Pinkerton, E. W., and Wollenberg, E. K. (2009). Adaptive co-management for social-ecological complexity. *Frontiers in Ecology and the Environment*, 7(2):95–102.

Arrow, K. J. (2000). Introduction. In Dasgupta, P. and Serageldin, I. (editors), *Social Capital: A Multifaceted Perspective*, pages 3–5. The World Bank, Washington, D.C.

Axhemi, A. and Axhemi, S. (2015). Some Environmental Problems Between Albania and Montenegro and the Effects on the Local Population. In Culshaw, M. G., Booth, S. J., Osipov, V. I., and Victorov, A. S. (editors), *Environmental Security of the European Cross-Border Energy Supply Infrastructure*, pages 247–253. Springer Science+Business Media Dordrecht.

Ballet, J., Sirven, N., and Requiers-Desjardins, M. (2007). Social Capital and Natural Resource Management: A Critical Perspective. *The Journal of Environment & Development*, 16(4):355–374.

Barkin, D. (1998). Wealth, Poverty, and Sustainable Development. *Mexico City: Center for Ecology and Development*.

Barnes, M., Kalberg, K., Pan, M., and Leung, P. (2016). When is brokerage negatively associated with economic benefits? Ethnic diversity, competition, and common-pool resources. *Social Networks*, 45:55–65.

Barnes-Mauthe, M., Gray, S. A., Arita, S., Lynham, J., and Leung, P. (2014). What Determines Social Capital in a Social-Ecological System? Insights from a Network Perspective. *Environmental Management*, 55(2):392–410.

Barnett, A. J. and Eakin, H. C. (2015). "We and us, not I and me": Justice, social capital, and household vulnerability in a Nova Scotia fishery. *Applied Geography*, 59:107–116.

Basurto, X., Bennett, A., Weaver, A. H., Rodriguez-Van Dyck, S., and Aceves-Bueno, J. S. (2013a). Cooperative and noncooperative strategies for small-scale fisheries' self-governance in the globalization era: Implications for conservation. *Ecology and Society*, 18(4):38.

Basurto, X., Gelcich, S., and Ostrom, E. (2013b). The social-ecological system framework as a knowledge classificatory system for benthic small-scale fisheries. *Global Environmental Change*, 23(6):1366–1380.

Basurto, X. and Ostrom, E. (2009). Beyond the Tragedy of the Commons. *Economia delle fonti di energia e dell'ambiente*, pages 35–60.

Bavinck, M. and Vivekanandan, V. (2011). Conservation, conflict and the governance of fisher wellbeing: Analysis of the establishment of the Gulf of Mannar National Park and Biosphere Reserve. *Environmental Management*, 47(4):593–602.

Begossi, A., Salyvonchyk, S., Nora, V., Lopes, P. F., and Silvano, R. A. M. (2012). The Paraty artisanal fishery (southeastern Brazilian coast): ethnoecology and management of a social-ecological system (SES). *Journal of ethnobiology and ethnomedicine*, 8(1):22.

Bekteshi, A., Rrakaj, M., and Lacej, I. (2013). Legal Framework of Shkodra Lake. Performing the Integrated Environmental Management Plan at local level in the Shkodra Lake Ecosystem.

Berkes, F. (2004a). Rethinking Community-Based Conservation. *Conservation Biology*, 18(3):621–630.

Berkes, F. (2004b). Rethinking Community-Based Conservation / Repensando la Conservación Basada en Comunidades. *Conservation Biology*, 18(3):621–630.

Berkes, F., Mahon, R., McConney, P., Pollnac, R., and Pomeroy, R. (2001). *Managing Small-Scale Fisheries: Alternative Directions and Methods*. International Development Research Centre.

Berkes et al., F. (2006). Globalization, roving bandits, and marine resources. *Science*, 311(March):1557–1558.

Biggs, D., Abel, N., Knight, A. T., Leitch, A., Langston, A., and Ban, N. C. (2011). The implementation crisis in conservation planning: could "mental models" help? *Conservation Letters*, 4(3):169–183.

Binder, C. R., Hinkel, J., Bots, P. W. G., and Pahl-Wostl, C. (2013). Comparison of frameworks for analyzing social-ecological systems. *Ecology and Society*, 18(4):26.

Bodin, Ö., Crona, B., and Ernstson, H. (2006). Social Networks in Natural Resource Management: What Is There to Learn from a Structural Perspective? *Ecology and Society*, 11(2).

Bodin, Ö., Crona, B., Thyresson, M., Golz, A.-L., and Tengö, M. (2014). Conservation Success as a Function of Good Alignment of Social and Ecological Structures and Processes. *Conservation Biology*, 28(5):1371–1379.

Bodin, Ö. and Crona, B. I. (2008). Management of Natural Resources at the Community Level: Exploring the Role of Social Capital and Leadership in a Rural Fishing Community. *World Development*, 36(12):2763–2779.

Bodin, Ö. and Crona, B. I. (2009). The role of social networks in natural resource governance: What relational patterns make a difference? *Global Environmental Change*, 19(3):366–374.

Bonaiuto, M., Carrus, G., Martorella, H., and Bonnes, M. (2002). Local identity processes and environmental attitudes in land use changes: The case of natural protected areas. *Journal of Economic Psychology*, 23(5):631–653.

Bouma, J., Bulte, E., and Van Soest, D. (2008). Trust and cooperation: Social capital and community resource management. *Journal of Environmental Economics and Management*, 56(2):155–166.

Bowles, S. and Gintis, H. (2002). Social Capital and Community Governance. *The Economic Journal*, 112:419–436.

Brondizio, E. S., Ostrom, E., and Young, O. R. (2009). Connectivity and the Governance of Multilevel Social-Ecological Systems: The Role of Social Capital. *Annual Review of Environment and Resources*, 34(1):253–278.

Brown, R. (2000). Social identity theory: Past achievements, current problems and future challenges. *European Journal of Social Psychology*, 30:745–778.

Burt, R. S. (2000). *The Network Structure Of Social Capital*, volume 22. Elsevier Masson SAS.

Cárcamo, P. F., Garay-Flühmann, R., and Gaymer, C. F. (2014). Collaboration and knowledge networks in coastal resources management: How critical stakeholders interact for multiple-use marine protected area implementation. *Ocean and Coastal Management*, 91:5–16.

Carlsson, L. and Berkes, F. (2005). Co-management: Concepts and methodological implications. *Journal of Environmental Management*, 75(1):65–76.

Caveen, A., Polunin, N., Gray, T., and Stead, S. M. (2015). *The Controversy over Marine Protected Areas – Science meets Policy*. Springer International Publishing Switzerland.

Chaffin, B. C. and Gunderson, L. H. (2016). Emergence, institutionalization and renewal: Rhythms of adaptive governance in complex social-ecological systems. *Journal of Environmental Management*, 165:81–87.

Cheung, W. W. L., Watson, R., and Pauly, D. (2013). Signature of ocean warming in global fisheries catch. *Nature*, 497(7449):365–368.

Chuenpagdee, R. and Jentoft, S. (2007). Step zero for fisheries co-management: What precedes implementation. *Marine Policy*, 31(6):657–668.

Cinner, J. and Huchery, C. (2014). A comparison of social outcomes associated with different fisheries co-management institutions. *Conservation Letters*, 7(3):224–232.

Cinner, J. E., Daw, T., and McClanahan, T. R. (2009a). Socioeconomic factors that affect artisanal fishers' readiness to exit a declining fishery. *Conservation Biology*, 23(1):124–130.

Cinner, J. E., McClanahan, T. R., Daw, T. M., Graham, N. a. J., Maina, J., Wilson, S. K., and Hughes, T. P. (2009b). Linking Social and Ecological Systems to Sustain Coral Reef Fisheries. *Current Biology*, 19(3):206–212.

Cinti, a., Shaw, W., Cudney-Bueno, R., and Rojo, M. (2010). The unintended consequences of formal fisheries policies: Social disparities and resource overuse in a major fishing community in the Gulf of California, Mexico. *Marine Policy*, 34(2):328–339.

Coleman, E. A. and Steed, B. C. (2009). Monitoring and sanctioning in the commons: An application to forestry. *Ecological Economics*, 68(7):2106–2113.

Coleman, J. S. (1988). Social Capital in the Creation of Human Capital. *American Journal of Sociology*, 94:S95–S120.

Cooke, S. J., Nguyen, V. M., Dettmers, J. M., Arlinghaus, R., Quist, M. C., Tweddle, D., Weyl, O. L. F., Raghavan, R., Portocarrero-Aya, M., Agudelo Cordoba, E., and Cowx, I. G. (2016). Sustainable inland fisheries – perspectives from the recreational, commercial and subsistence sectors from around the globe. In Closs, G. P., Krkosek, M., and Olden, J. D. (editors), *Conservation of Freshwater Fishes*, pages 467–505. Cambridge University Press.

Cooke, S. J., Suski, C. D., Arlinghaus, R., and Danylchuk, A. J. (2013). Voluntary institutions and behaviours as alternatives to formal regulations in recreational fisheries management. *Fish and Fisheries*, 14(4):439–457.

Costello, C., Ovando, D., Clavelle, T., Strauss, C., Hilborn, R., Melnychuk, M., Branch, T. A., Gaines, S. D., Szuwalski, C., Cabrai, R., Rader, D., and Leland, A., in press (2016). Global fishery futures under contrasting management regimes. *Proceedings of the National Academy of Sciences of the United States of America*.

Costello, C., Ovando, D., Hilborn, R., Gaines, S. D., Deschenes, O., and Lester, S. E. (2012). Status and Solutions for the World's Unassessed Fisheries. *Science*, 338(6106):517–520.

Cox, M. (2014). Applying a Social-Ecological System Framework to the Study of the Taos Valley Irrigation System. *Human Ecology*, 42(2):311–324.

Cox, M., Arnold, G., and Villamayor, S. (2010). A Review of Design Principles for Community-based Natural Resource Management. *Ecology and Society*, 15(4):28.

Cox, M. and Frey, U. J. (2011). Building a Diagnostic Ontology of Social-Ecological Systems. *Political Theory*, 9(2):1–24.

Cullaj, A., Hasko, A., Miho, A., Schanz, F., Brandl, H., and Bachofen, R. (2005). The quality of Albanian natural waters and the human impact. *Environment International*, 31(1):133–146.

Daedlow, K., Beckmann, V., Schlüter, M., and Arlinghaus, R. (2013). Explaining institutional persistence, adaptation, and transformation in East German recreational-fisheries governance after the German reunification in 1990. *Ecological Economics*, 96:36–50.

Daly, H. E. (2014). *Beyond Growth: The Economics of Sustainable Development*. Beacon Press.

Dasgupta, P. (2000). Trust as a Commodity. In Gambetta, D. (editor), *Trust: Making and Breaking Cooperative Relations*, pages 49–72. Department of Sociology, University of Oxford, electronic edition.

DeCaro, D. a. and Stokes, M. K. (2013). Public participation and institutional fit: a social-psychological perspective. *Ecology and Society*, 18(4):40.

Dedej, Z., Ziu, T., Bejko, D., Miskovic, M., Spicanovic, M., and Subotic, V. (2010). Assessment on Current Situation of Shkodra/Skadar Lake RAMSAR Site. Regional Environmental Center Albania & Ramsar.

Delgado-Serrano, M. d. M. and Ramos, P. A. (2015). Making Ostrom's framework applicable to characterise social ecological systems at the local level. *International Journal of the Commons*, 9(2):808–830.

Dimitrova-Grajzl, V., Grajzl, P., and Guse, A. J. (2012). Trust, perceptions of corruption, and demand for regulation: Evidence from post-socialist countries. *Journal of Socio-Economics*, 41(3):292–303.

Dong, S., Lassoie, J., Shrestha, K. K., Yan, Z., Sharma, E., and Pariya, D. (2009). Institutional development for sustainable rangeland resource and ecosystem management in mountainous areas of northern Nepal. *Journal of Environmental Management*, 90(2):994–1003.

Durlauf, S. N. (1999). The case "against" social capital. *Focus*, 20(3):1–5.

EC, European Commission (2012). Commission Staff Working Document Albania 2012 Progress Report. (2013):1–8.

Economic Commission for Europe (2002). *Environmental Performance Review Albania*. United Nations, New York and Geneva.

Epstein, G., Pittman, J., Alexander, S. M., Berdej, S., Dyck, T., Kreitmair, U., Raithwell, K. J., Villamayor-Tomas, S., Vogt, J., and Armitage, D. (2015). Institutional fit and the sustainability of social-ecological systems. *Current Opinion in Environmental Sustainability*, 14:34–40.

Epstein, G., Vogt, J. M., Mincey, S. K., Cox, M., and Fischer, B. (2013). Missing ecology: Integrating ecological perspectives with the social-ecological system framework. *International Journal of the Commons*, 7(2):432–453.

Eurofish Magazine (2012). Crisis hinders enforcement efforts. Eurofish Magazine. http://eurofishmagazine.com/magazine/magazine-archive/345-em-4-2012. Last access 2016-03-02.

Eurofish Magazine (2015). Enforcement requires coordination across ministries. Eurofish Magazine. http://eurofishmagazine.com/magazine/current-issue/439-eurofish-magazine-issue-5-2015-september-october. Last access 2016-03-02.

FAO (2014). The state of world fisheries and aquaculture. http://www.fao.org/3/a-i3720e/index.html. Last access 2016-03-10.

Fischer, J., Gardner, T. A., Bennett, E. M., Balvanera, P., Biggs, R., Carpenter, S., Daw, T., Folke, C., Hill, R., Hughes, T. P., Luthe, T., Maass, M., Meacham, M., Norström, A. V., Peterson, G., Queiroz, C., Seppelt, R., Spierenburg, M., and Tenhunen, J. (2015). Advancing sustainability through mainstreaming a social-ecological systems perspective. *Current Opinion in Environmental Sustainability*, 14:144–149.

Fishery Directorate, Albania (2005). Regulation No 1 date 29.03.2005, For application of the legislation on fishery and aquaculture.

Folke, C., Carpenter, S., Elmqvist, T., Gunderson, L., Holling, C. S., Walker, B., Bengtsson, J., and Berkes, F. R. (2002). Resilience and Sustainable Development: Building Adaptive Capacity in a World of Transformations. *ICSU Series on Science for Sustainable Development, 3*, 31(5):1–74.

Folke, C., Hahn, T., Olsson, P., and Norberg, J. (2005). Adaptive Governance of Social-Ecological Systems. *Annual Review of Environment and Resources*, 30(1):441–473.

Freeman, R. E. (2010). *Strategic Management – A Stakeholder Approach*. Cambridge University Press, New York.

Friedlander, A., Sladek Nowlis, J., Sanchez, J. A., Appeldoorn, R., Usseglio, P., Mccormick, C., Bejarano, S., and Mitchell-Chui, A. (2003). Designing Effective Marine Protected Areas in Seaflower Biosphere Reserve, Colombia, Based on Biological and Sociological Information. *Conservation Biology*, 17(6):1769–1784.

Fukuyama, F. (1999). Social Capital and Civil Society. In *IMF Conference on Second Generation Reforms*.

Gardner, R., Ostrom, E., and Walker, J. M. (1990). The Nature of Common-Pool Resource Problems. *Rationality and Society*, 2(3):335–358.

Gargiulo, M. and Benassi, M. (2000). Trapped in Your Own Net? Network Cohesion, Structural Holes, and the Adaptation of Social Capital. *Organization Science*, 11(2):183–196.

Gatzweiler, F. W. and Hagedorn, K. (2002). The evolution of institutions in transition. *International Journal of Agricultural Resources, Governance and Ecology*, 2(1):37–58.

Ghiurghi, A. (2011). Institutional Support to the management of Protected Areas in Albania. http://www.iucn.org/about/union/secretariat/offices/europe/about/places/belgrade/projects/

?8591/Institutional-Support-to-the-management-of-Protected-Areas-in-Albania. Last access 2015-10-23.

Glaser, M. and Glaeser, B. (2014). Towards a framework for cross-scale and multi-level analysis of coastal and marine social-ecological systems dynamics. *Regional Environmental Change*, 14:2039–2052.

Grafton, R. Q. (1996). Individual transferable quotas: theory and practice. *Reviews in Fish Biology and Fisheries*, 6:5–20.

Grafton, R. Q. (2005). Social capital and fisheries governance. *Ocean and Coastal Management*, 48(9-10):753–766.

Granovetter, M. S. (1973). The Strength of Weak Ties. *American Journal of Sociology*, 78(6):1360–1380.

Grazhdani, D. D. (2014). Are Fishing Activities Jeopardizing The Water Ecosystem Biodiversity In Trans-Boundary Protected Area AL-Shkodra? *International Journal of Innovative Research in Science, Engineering and Technology*, 3(8):15051–15059.

Gregorio, M. D., Hagedorn, K., Kirk, M., Korf, B., Mccarthy, N., Meinzen-dick, R., and Swallow, B. (2008). Property rights, collective action, and poverty. *CGIAR Systemwide Program on Collective Action and Property Rights*, (81).

Grootaert, C. and Van Bastelaer, T. (2002). *Understanding and measuring social capital - a multidisciplinary tool for practitioners*. The World Bank Washington, D.C.

Grudnik, Z. M. and Kajsek, P. D. (2011). Lake skadar/shkoder monitoring programme development. ERICo Velenje.

Gutiérrez, N. L., Hilborn, R., and Defeo, O. (2011). Leadership, social capital and incentives promote successful fisheries. *Nature*, 470(7334):386–389.

Hagedorn, K. (2002). Institutional Arrangements for Environmental Co-operatives: a Conceptional Framework. *New Horizons in Environmental Economics*, pages 1–25.

Hancock, D. and Algozzine, B. (2006). *Doing case study research: A practical guide for beginning researchers*. Teachers College Press, Amsterdam, New York.

Hardin, G. (1968). The Tragedy of the Commons. *Science*, 162(3859):1243–1248.

Harkes, I. H. (2006). *Fisheries co-management, the role of local institutions and decentralisation in Southeast Asia*. PhD thesis, University of Leiden.

Hatcher, A., Jaffry, S., Thébaud, O., and Bennett, E. (2000). Normative and Social Influences Affecting Compliance with Fishery Regulations. *Land Economics*, 76(3):448–461.

Heck, N., Stedman, R. C., and Gaden, M. (2015). The integration of social science information into Great Lakes fishery management: Opportunities and challenges. *Fisheries Research*, 167:30–37.

Herrera-Racionero, P., Lizcano-Fernández, E., and Miret-Pastor, L. (2015). "Us" and "them". Fishermen from Gandía and the loss of institutional legitimacy. *Marine Policy*, 54:130–136.

Hicks, C. C., Stoeckl, N., Cinner, J. E., and Robinson, J. (2014). Fishery benefits and stakeholder priorities associated with a coral reef fishery and their implications for management. *Environmental Science and Policy*, 44:258–270.

Hilborn, R. (2007a). Defining success in fisheries and conflicts in objectives. *Marine Policy*, 31(2):153–158.

Hilborn, R. (2007b). Managing fisheries is managing people: what has been learned? *Fish and Fisheries*, 8:285–296.

Hinkel, J., Bots, P. W. G., and Schlüter, M. (2014). Enhancing the Ostrom social-ecological system framework through formalization. *Ecology and Society*, 19(3):51.

Hinkel, J., Schlüter, M., Cox, M., Binder, C. R., and Falk, T. (2015). A diagnostic procedure for applying the social-ecological systems framework in diverse cases. *Ecology & Society*, 20(1):32.

Hirschman, A. O. (1970). *Exit, voice, and loyalty: Responses to decline in firms, organizations, and states*, volume 25. Harvard University Press.

Holland, J. (1998). Does Social Capital Matter? The Case of Albania. *IDS Bulletin*, 29(3):65–71.

Holling, C. S. (1973). Resilience and Stability of Ecological Systems. *Annual Review of Ecology and Systematics*, 4:1–23.

Hovardas, T. and Poirazidis, K. (2007). Environmental policy beliefs of stakeholders in protected area management. *Environmental Management*, 39(4):515–525.

Hudson, J. (2006). Institutional trust and subjective well-being across the EU. *Kyklos*, 59(1):43–62.

Hunt, L. M., Sutton, S. G., and Arlinghaus, R. (2013). Illustrating the critical role of human dimensions research for understanding and managing recreational fisheries within a social-ecological system framework. *Fisheries Management and Ecology*, 20(2-3):111–124.

Immergut, E. (1998). The Theoretical Core of the New Institutionalism. *Politics & Society*, 26(1):5–34.

Imperial, M. T. (1999). Institutional Analysis and Ecosystem-Based Management: The Institutional Analysis and Development Framework. *Environmental Management*, 24(4):449–465.

Imperial, M. T. and Yandle, T. (2005). Taking Institutions Seriously: Using the IAD Framework to Analyze Fisheries Policy. *Society & Natural Resources*, 18(6):493–509.

Ishihara, H. and Pascual, U. (2009). Social capital in community level environmental governance: A critique. *Ecological Economics*, 68(5):1549–1562.

Janssen, M. and Ostrom, E. (2001). Critical factors that foster local self-governance of common-pool resources: The role of heterogeneity. *Inequality, Collective Action and Environmental Sustainabiliy*, (September):21–23.

Jentoft, S. (2000a). Legitimacy and disappointment in fisheries management. *Marine Policy*, 24(2):141–148.

Jentoft, S. (2000b). The community: A missing link of fisheries management. *Marine Policy*, 24(1):53–59.

Jentoft, S., McCay, B. J., and Wilson, D. C. (1998). Social theory and fisheries co-management. *Marine Policy*, 22(4-5):423–436.

Jentoft, S., van Son, T. C., and Bjørkan, M. (2007). Marine protected areas: A governance system analysis. *Human Ecology*, 35(5):611–622.

Johannes, R. E. and Neis, B. (2007). The value of anecdote. In *Fishers' knowledge in fisheries science and management*, pages 41–58. UNESCO.

Johnson, C. (2004). Uncommon ground: The 'Poverty of History' in common property discourse. *Development and Change*, 35(3):407–433.

Jones, N., Clark, J. R. A., Panteli, M., Proikaki, M., and Dimitrakopoulos, P. G. (2012). Local social capital and the acceptance of Protected Area policies: An empirical study of two Ramsar river delta ecosystems in northern Greece. *Journal of Environmental Management*, 96(1):55–63.

Jones, N. A., Shaw, S., Ross, H., Witt, K., and Pinner, B. (2016). The study of human values in understanding and managing social-ecological systems. *Ecology and Society*, 21(1):15.

Kajsiu, B. (2010). Down with Politics! The Crisis of Representation in Post-Communist Albania. *East European Politics and Societies*, 24(2):229–253.

Karper, M. a. M. and Lopes, P. F. M. (2014). Punishment and compliance: Exploring scenarios to improve the legitimacy of small-scale fisheries management rules on the Brazilian coast. *Marine Policy*, 44:457–464.

Katnic, A. (2013). Environmental Management Action Plan. Report, Green Home.

Kelleher, G. (1999). *Guidelines for Marine Protected Areas.* Number Best Practice Protected Area Guidelines Series No. 3. IUCN, Gland, Switzerland, and Cambridge, UK.

Kittinger, J. N., Finkbeiner, E. M., Ban, N. C., Broad, K., Carr, M. H., Cinner, J. E., Gelcich, S., Cornwell, M. L., Koehn, J. Z., Basurto, X., Fujita, R., Caldwell, M. R., and Crowder, L. B. (2013). Emerging frontiers in social-ecological systems research for sustainability of small-scale fisheries. *Current Opinion in Environmental Sustainability*, 5(3-4):352–357.

Kluvánková-Oravská, T., Chobotová, V., Banaszak, I., Slavikova, L., and Trifunovova, S. (2009). From government to governance for biodiversity: The perspective of Central and Eastern European transition countries. *Environmental Policy and Governance*, 19(3):186–196.

Kopelman, S., Weber, J. M., and Messick, D. M. (2002). Factors Influencing Cooperation in Commons Dilemmas: A Review of Experimental Psychological Research. In Ostrom, E., Dietz, T., Dolsak, N., Stern, P. C., Stonich, S., and Weber, E. U. (editors), *The Drama of the Commons – Committee on the Human Dimensions of Global Change*, pages 113–156. National Research Council.

Kowalski, A. A. and Jenkins, L. D. (2015). The role of bridging organizations in environmental management: examining social networks in working groups. *Ecology and Society*, 20(2):16.

Krishna, A. and Shrader, E. (2002). The Social Capital Assessment Tool: Design and Implementation. In Grootaert, C. and Van Bastelaer, T. (editors), *Understanding and measuring social capital – a multidisciplinary tool for practitioners*, pages 17–40.

Lawson, C. and Saltmarshe, D. (2000). Security and Economic Transition: Evidence from North Albania. *Europe-Asia Studies*, 52(1):133–148.

Lebel, L., Anderies, J. M., Campbell, B., Folke, C., Hatfield-Dodds, S., Hughes, T. P., and Wilson, J. (2006). Governance and the Capacity to Manage Resilience in Regional Social-Ecological Systems. *Ecology and Society*, 11(1):19.

Lehtonen, M. (2004). The environmental-social interface of sustainable development: Capabilities, social capital, institutions. *Ecological Economics*, 49(2):199–214.

Leonard, N. J. (2008). *Role of social network structure in the governance of Great Lakes transboundary fish stocks*. PhD thesis, Michigan State University.

Leslie, H. M., Basurto, X., Nenadovic, M., Sievanen, L., Cavanaugh, K. C., Cota-Nieto, J. J., Erisman, B. E., Finkbeiner, E., Hinojosa-Arango, G., Moreno-Báez, M., Nagavarapu, S., Reddy, S. M. W., Sánchez-Rodríguez, A., Siegel, K., Ulibarria-Valenzuela, J. J., Weaver, A. H., and Aburto-Oropeza, O. (2015a). Operationalizing the social-ecological systems framework to assess sustainability. *Proceedings of the National Academy of Sciences*, 112(19):5979–5984.

Leslie, H. M., Basurto, X., Nenadovic, M., Sievanen, L., Cavanaugh, K. C., Cota-Nieto, J. J., Erisman, B. E., Finkbeiner, E., Hinojosa-Arango, G., Moreno-Báez, M., Nagavarapu, S., Reddy, S. M. W., Sánchez-Rodríguez, A., Siegel, K., Ulibarria-Valenzuela, J. J., Weaver, A. H., and Aburto-Oropeza, O. (2015b). Supporting Information Appendix for Operationalizing the social-ecological systems framework to assess sustainability.

Levin, D. Z. (2004). The Strength of Weak Ties You Can Trust : The Mediating Role of Trust in Effective Knowledge Transfer. *Management Science*, 50(11):1477–1490.

Levin, S., Xepapadeas, T., Crépin, A.-S., Norberg, J., de Zeeuw, A., Folke, C., Hughes, T., Arrow, K., Barrett, S., Daily, G., Ehrlich, P., Kautsky, N., Mäler, K.-G., Polasky, S., Troell, M., Vincent, J. R., and Walker, B. (2013). Social-ecological systems as complex adaptive systems: modeling and policy implications. *Environment and Development Economics*, 18(02):111–132.

Liu, J., Dietz, T., Carpenter, S. R., Alberti, M., Folke, C., Moran, E., Pell, A. N., Deadman, P., Kratz, T., Lubchenco, J., Ostrom, E., Ouyang, Z., Provencher, W., Redman, C. L., Schneider, S. H., and Taylor, W. W. (2007). Complexity of Coupled Human and Natural Systems. *Science*, 317(5844):1513–1516.

Lochner, K., Kawachi, I., and Kennedy, B. P. (1999). Social capital: A guide to its measurement. *Health and Place*, 5(4):259–270.

Lubchenco, J. and Grorud-Colvert, K. (2015). Making Waves: The science and politics of ocean protection. *Science (New York, N.Y.)*, 1(October):22–23.

Lubell, M. and Scholz, J. T. (2001). Cooperation, Reciprocity, and the Collective-Action Heuristic. *American Journal of Political Science*, 45(1):160–178.

Lynch, A. J., Cooke, S. J., Deines, A. M., Bower, S. D., Bunnell, D. B., Cowx, I. G., Nguyen, V. M., Nohner, J., Phouthavong, K., Riley3, B., Rogers, M. W., Taylor, W. W., Woelmer, W., Youn, S.-J., and T. Douglas Beard, J. (2016). The social, economic, and environmental importance of inland fishes and fisheries. *Environmental Reviews*, 7(February):1–7.

Mascia, M. B., Claus, C. A., and Naidoo, R. (2010). Impacts of marine protected areas on fishing communities. *Conservation Biology*, 24(5):1424–1429.

Mathevet, R., Etienne, M., Lynam, T., and Calvet, C. (2011). Water management in the Camargue biosphere reserve: Insights from comparative mental models analysis. *Ecology and Society*, 16(1):43.

Mayring, P. (2000). Qualitative content analysis. *Forum: Qualitative Social Research*, (December).

Mayring, P. and Fenzl, T. (2014). Qualitative Inhaltsanalyse. In Baur, N. and Blasius, J. (editors), *Handbuch Methoden der empirischen Sozialforschung*, pages 543–558. Springer VS Fachmedien Wiesbaden.

Mazurski, K. R. (1991). Communisms and the Environment. *Forum For Applied Research and Public Policy*, Winter:39–41.

McCay, B. and Jentoft, S. (1998). Market or Community Failure? Critical Perspectives on Common Property Research. *Human Organization*, 57(1):21–29.

McClanahan, T. R., Castilla, J. C., White, A. T., and Defeo, O. (2009). Healing small-scale fisheries by facilitating complex socio-ecological systems. *Reviews in Fish Biology and Fisheries*, 19(1):33–47.

McGinnis, M. D. (2011). An Introduction to IAD and the Language of the Ostrom Workshop: A Simple Guide to a Complex Framework. *Policy Studies Journal*, 39(1):169–183.

McGinnis, M. D. and Ostrom, E. (2010). IAD and SES Dynamic Flows: Introducing the Program in Institutional Analysis of Social-Ecological Systems (PIASES) Framework. *Preliminary draft of a paper to be presented at 13th Economics of Infrastructures Conference, Delft, Netherlands*.

McGinnis, M. D. and Ostrom, E. (2014). Social-ecological system framework: Initial changes and continuing challenges. *Ecology and Society*, 19(2):30.

Meek, C. L. (2013). Forms of collaboration and social fit in wildlife management: A comparison of policy networks in Alaska. *Global Environmental Change*, 23(1):217–228.

Meinzen-Dick, R. and Knox, A. (1999). Collective Action, Property Rights, and Devolution of Natural Resource Management: A Conceptual Framework. Workshop draft, 07/15/99.

Mertens, F., Fillion, M., Saint-Charles, J., Mongeau, P., Távora, R., José Sousa Passos, C., and Mergler, D. (2015). The role of strong-tie social networks in mediating food security of

fish resources by a traditional riverine community in the Brazilian Amazon. *Ecology and Society*, 20(3):18.

Millenium Ecosystem Assessment (2005). *Ecosystems and human well-being – Biodiversity synthesis*. Island Press, Washington, DC.

Müller, D. and Munroe, D. K. (2008). Changing Rural Landscapes in Albania: Cropland Abandonment and Forest Clearing in the Postsocialist Transition. *Annals of the Association of American Geographers*, 98(4):855–876.

Murray, C. (2008). Social Capital and Cooperation in Central and Eastern Europe – A Framework for Research on Governance. *Journal of Rural Cooperation*, 36(1):3–20.

Musaraj, S. (2011). Tales From Albarado: The Materiality of Pyramid Schemes in Postsocialist Albania. *Cultural Anthropology*, 26(1):84–110.

Nagendra, H. and Ostrom, E. (2014). Applying the social-ecological system framework to the diagnosis of urban lake commons in Bangalore, India. *Ecology and Society*, 19(2):67.

North, D. C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press.

Olson, M. (1971). *The Logic of Collective Action: Public Goods and the Theory of Groups*. Harvard University Press.

Olsson, P., Folke, C., and Berkes, F. (2004). Adaptive comanagement for building resilience in social-ecological systems. *Environmental Management*, 34(1):75–90.

Onyango, P. and Jentoft, S. (2007). Embedding co-management: Community-based Fisheries Regimes in Lake Victoria, Tanzania. *Conference Paper*.

Ostrom, E. (1986). An agenda for the study of institutions. *Public Choice*, 48(1):3–25.

Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press.

Ostrom, E. (2005). *Understanding Institutional Diversity*. Princeton University Press.

Ostrom, E. (2007a). A diagnostic approach for going beyond panaceas. *Proceedings of the National Academy of Sciences of the United States of America*, 104(39):15181–15187.

Ostrom, E. (2007b). The Meaning of Social Capital and Its Link to Collective Action. *SSRN Electronic Journal*, pages 1–34.

Ostrom, E. (2009). A general framework for analyzing sustainability of social-ecological systems. *Science (New York, N.Y.)*, 325(5939):419–422.

Ostrom, E. (2010). Institutional analysis and development: Elements of the framework in historical perspective. *Encyclopedia of Life Support Systems (EOLSS)*, II.

Ostrom, E. (2011). Background on the Institutional Analysis and Development Framework. *Policy Studies Journal*, 39(1):7–27.

Ostrom, E. (2012). Collective Action and the Evolution of Social Norms. *The Journal of Economic Perspectives*, 14(3):137–158.

Ostrom, E. and Ahn, T. K. (2001). A social science perspective on social capital: social capital and collective action. *The Journal Of The British Sociological Association*, (July):812–855.

Ostrom, E. and Cox, M. (2010). Moving beyond panaceas: a multi-tiered diagnostic approach for social-ecological analysis. *Environmental Conservation*, 37(04):451–463.

Pahl-Wostl, C., Holtz, G., Kastens, B., and Knieper, C. (2010). Analyzing complex water governance regimes: The Management and Transition Framework. *Environmental Science and Policy*, 13(7):571–581.

Paldam, M. (2001). Social capital and sustainability. http://www.martin.paldam.dk/Papers/Gamle/Berlin.PDF.

Paldam, M. and Svendsen, G. T. (2001). Missing social capital and the transition in Eastern Europe. *Journal of Institutional Innovation, Development and Transition*, 5:21–34.

Papathimiu, S. (2012). The demographic and economic development of Albania during and after the decline of Communist regime (1945-2010). *Treballs de la Societat Catalana de Geografia*, 73(June):101–118.

Pauly, D., Christensen, V., Guénette, S., Pitcher, T. J., Sumaila, U. R., Walters, C. J., Watson, R., and Zeller, D. (2002). Towards sustainability in world fisheries. *Nature*, 418(6898):689–695.

Pauly, D. and Zeller, D. (2016). Catch reconstructions reveal that global marine fisheries catches are higher than reported and declining. *Nature Communications*, 7:10244.

Peveling, R., Brämick, U., Densky, H., Parr, B., and Pietrock, M. (2015). Initial Characterisation of Lakes Prespa, Ohrid and Shkodra/Skadar – Implementing the EU Water Framework Directive in South-Eastern Europe. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

Pimbert, M. P. and Pretty, J. N. (1995). Parks, People and Professionals: Putting 'Participation' into Protected Area Management. Discussion paper No 57, UNRISD, Geneva.

Pinkerton, E. W. and Weinstein, M. (1995). Fisheries That Work – Sustainability Through Community-Based Management. Report, The David Suzuki Foundation.

Plummer, R. and Fitzgibbon, J. (2006). People matter: The importance of social capital in the co-management of natural resources. *Natural Resources Forum*, 30(1):51–62.

Pollnac, R., Christie, P., Cinner, J. E., Dalton, T., Daw, T. M., Forrester, G. E., Graham, N. a. J., and McClanahan, T. R. (2010). Marine reserves as linked social-ecological systems. *Proceedings of the National Academy of Sciences of the United States of America*, 107(43):18262–18265.

Pomeroy, R. S., Katon, B. M., and Harkes, I. (2001). Conditions affecting the success of fisheries co-management: Lessons from Asia. *Marine Policy*, 25(3):197–208.

Portes, A. (1998). Social Capital: Its Origins and Applications in Modern Sociology. *Annual Review of Sociology*, 24(1):1–24.

Poteete, A. R., Janssen, M. A., and Ostrom, E. (2010). *Working together: Collective Action, the Commons, and Multiple Methods in Practice*. Princeton University Press.

Prato, G. B. (2013). Corruption between public and private moralities: The Albanian case in a comparative perspective. *Human Affairs*, 23:196–211.

Pretty, J. (2003). Social capital and the collective management of resources. *Science (New York, N.Y.)*, 302(5652):1912–1914.

Pretty, J. and Smith, D. (2004). Social capital in biodiversity conservation and management. *Conservation Biology*, 18(3):631–638.

Pretty, J. and Ward, H. (2001). Social capital and the environment. *World Development*, 29(2):209–227.

Putnam, R. D. (1995). Bowling Alone: America's Declining Social Capital. *Journal of Democracy*, 6:65–78.

Qiriazi, P. and Sala, S. (2000). Environmental Problems of Albania. In Volume 72 of the series NATO Science Series (editor), *Remote Sensing for Environmental Data in Albania: A Strategy for Integrated Management*, pages 13–30. Springer Netherlands.

Raakjær Nielsen, J. (2003). An analytical framework for studying: compliance and legitimacy in fisheries management. *Marine Policy*, 27(5):425–432.

Rama, K. and Theesfeld, I. (2011). The Strengths and Weaknesses of Albania's Customary Rules in Natural Resource Management in the Light of Devolution Policies. *Quarterly Journal of International Agriculture*, 50(4):369–387.

Ramsar Sites Information Series (2006). Lake Shkodra and River Buna. https://rsis.ramsar.org/ris/1598. 2015-03-15.

Raymond, L. (2006). Cooperation without trust: Overcoming collective action barriers to endangered species protection. *Policy Studies Journal*, 34(1):37–57.

Raznatovic, A. and Dhora, D. (2001). Biodiversity Database of the Shkodra / Skadar – Fish. Report December.

REC, Regional Environmental Center Albania (2016). Mbahet në Shkodër Forumi i Hapur Qytetar. http://mjedisisot.info/index.php/te-tjera/aktiviteti-njerezor/667-mbahet-ne-shkoder-forumi-i-hapur-qytetar. Last access 2016-03-10.

Redpath, S. M., Young, J., Evely, A., Adams, W. M., Sutherland, W. J., Whitehouse, A., Amar, A., Lambert, R. a., Linnell, J. D. C., Watt, A., and Gutiérrez, R. J. (2013). Understanding and managing conservation conflicts. *Trends in Ecology and Evolution*, 28(2):100–109.

Robbins, P. (2000). The rotten institution: Corruption in natural resource management. *Political Geography*, 19(4):423–443.

Rochet, M. J., Prigent, M., Bertrand, J. A., Carpentier, A., Coppin, F., Delpech, J. P., Fontenelle, G., Foucher, E., Mah??, K., Rostiaux, E., and Trenkel, V. M. (2008). Ecosystem trends: Evidence for agreement between fishers' perceptions and scientific information. *ICES Journal of Marine Science*, 65(6):1057–1068.

Rodela, R. and Udovč, A. (2008). Participation in nature protection: Does it benefit the local community? A Triglav National Park case study. *The International Journal of Biodiversity Science & Management*, 4(4):37–41.

Rose-Ackerman, S. (2001). Trust and honesty in post-socialist societies. *Kyklos*, 54(2-3):415–443.

Rothstein, B. (2000). Trust, Social Dilemmas and Collective Memories. *Journal of Theoretical Politics*, 12(4):477–501.

Rothstein, B. and Uslaner, E. M. (2005). All for All: Equality, Corruption, and Social Trust. *World Politics*, 58(01):41–72.

Royal Haskoning (2006). Lake Shkoder Transboundary Diagnostics Analysis. Report April.

Rudd, M. A. (2000). Live long and prosper: Collective action, social capital and social vision. *Ecological Economics*, 34(1):131–144.

Sandlund, O. T. (2004). Fisheries Management Plan – Lake Shkodra. Nordenfjeldske Development Services AS and AquaVision Consulting Ltd Group.

Sandström, A. and Rova, C. (2010). Adaptive co-management networks: A comparative analysis of two fishery conservation areas in Sweden. *Ecology and Society*, 15(3).

Saunders, D. L., Meeuwig, J. J., and Vincent, A. C. J. (2002). Freshwater protected areas: Strategies for conservation. *Conservation Biology*, 16(1):30–41.

Schlager, E. and Ostrom, E. (1992). Property-Rights Regimes and Natural Resources: A Conceptual Analysis. *Land Economics*, 68(3):249–262.

Schlüter, A. and Madrigal, R. (2012). The SES Framework in a Marine Setting: Methodological Lessons. *Rationality, Markets and Morals*, 3:148–167.

Schlüter, M., Hinkel, J., Bots, P. W. G., and Arlinghaus, R. (2014). Application of the SES framework for model-based analysis of the dynamics of social-ecological systems. *Ecology and Society*, 19(1):36.

Schlüter, M., McAllister, R. R. J., Arlinghaus, R., Bunnefeld, N., Eisenack, K., Hölker, F., Milner-Gulland, E. J., and Müller, B. (2012). New Horizons for Managing the Environment: A Review of Coupled Social-Ecological Systems Modeling. *Natural Resource Modeling*, 25(1):219–272.

Schmidt, O. and Theesfeld, I. (2012). Elite Capture in Local Fishery Management – Post-socialist Experiences from Albania. *International Journal of Agricultural Resources Governance and Ecology*, 9(3-4):103–120.

Schweers Cook, K. (2005). Networks, Norms, and Trust: The Social Psychology of Social Capital – 2004 Cooley Mead Award. *Social Psychology Quarterly*, 68(1):4–14.

Scott, W. R. (2014). Crafting an Analytic Framework I: Three Pillars of Institutions. In *Institutions and Organizations*, pages 53–85. SAGE Publications, 4th edition.

Sekhar, N. U. (2007). Social capital and fisheries management: The case of Chilika Lake in India. *Environmental Management*, 39(4):497–505.

Simić, V., Simić, S., Paunović, M., Radojković, N., Petrović, A., Talevski, T., and Milošević, D. (2015). The Alburnus benthopelagic fish species of the Western Balkan Peninsula: An assessment of their sustainable use. *Science of The Total Environment*, 540:410–417.

Singleton, S. (2000). Cooperation or capture? The paradox of comanagement and community participation in natural resource management and environmental policymaking. *Environmental Politics*, 9(2):1–21.

Six, B., Zimmeren, E. V., Popa, F., and Frison, C. (2015). Trust and social capital in the design and evolution of institutions for collective action. *International Journal of the Commons*, 9(1):151–176.

Sobel, J. (2002). Can We Trust Social Capital? *Journal of Economic Literature*, 40(1):139–154.

Solow, R. M. (1999). Notes on Social Capital and Economic Performance. In Dasgupta, P. and Serageldin, I. (editors), *Social Capital: A Multifaceted Perspective*, pages 6–10. The World Bank, Washington, D.C.

Stanciu, E. and Ioniţă, A. (2014). *Governance of Protected Areas in Eastern Europe*. BfN-Skripten 360.

Stoop, J. T., van Soest, D. P., and Vyrastekova, J. (2013). A tale of two carrots: the effectiveness of multiple reward stages in a common pool resource game. In List, J. A. and Price, M. K. (editors), *Handbook on Experimental Economics and the Environment*, pages 291–318. Edward Elgar Publishing.

Story, W. T., Taleb, F., Ahasan, S. M. M., and Ali, N. a. (2015). Validating the Measurement of Social Capital in Bangladesh: A Cognitive Approach. *Qualitative Health Research*, 25(6):806–819.

Sumaila, U., Guénette, S., Alder, J., and Chuenpagdee, R. (2000). Addressing ecosystem effects of fishing using marine protected areas. *ICES Journal of Marine Science*, 57:752–760.

Sundström, A. (2013). Corruption in the commons: Why bribery hampers enforcement of environmental regulations in South African fisheries. *International Journal of the Commons*, 7(2):454–472.

Suškevičs, M., Tillemann, K., and Külvik, M. (2013). Assessing the relevance of stakeholder analysis for national ecological network governance: The case of the Green Network in Estonia. *Journal for Nature Conservation*, 21(4):206–213.

Szabo, E. A., Lawrence, A., Iusan, C., and Canney, S. (2008). Participatory protected area management – A case study from Rodna Mountains National Park, Romania. *International Journal of Biodiversity Science and Management*, 4:187–199.

Tajfel, H. and Turner, J. C. (2004). The social identity theory of intergroup behavior. In *Psychology of Intergroup Relations*, pages 276–293. Psychology Press, New York.

Theesfeld, I. and Boevsky, I. (2005). Reviving pre-socialist cooperative traditions: The case of water syndicates in Bulgaria. *Sociologia Ruralis*, 45(3):171–185.

Thiel, A., Adamseged, M. E., and Baake, C. (2015). *Environmental Science and Policy*, 53(Part B):152–164.

Transparency International (2016). Corruption Perceptions Index 2015: Results. https://www.transparency.org/cpi2015. Last access 2016-01-27.

Ulambayar, T. (2015). *Social Outcomes of Community-based Rangeland Management in Post-Socialist Mongolia: Influential Factors and Favorable Institutional Designs*. PhD thesis, Colorado State University.

Uphoff, N. (2000). Understanding social capital: learning from the analysis and experience of participation. In Dasgupta, P. and Serageldin (editors), *Social Capital*, pages 215–244.

Uslaner, E. M. and Badescu, G. (2004). Honesty, Trust, and Legal Norms in the Transition to Democracy: Why Bo Rothenstein is Better Able to Explain Sweden than Romania. In Kornai, J., Rothstein, B., and Rose-Ackermann, S. (editors), *Creating Social Trust in Post-Socialist Transition*, pages 31–52. Palgrave Macmillan, 1st edition.

Van Laerhoven, F. and Barnes, C. (2014). Communities and commons: The role of community development support in sustaining the commons. *Community Development Journal*, 49(SUPPL.1):118–132.

van Putten, I., Boschetti, F., Fulton, E. A., Smith, A. D. M., and Thebaud, O. (2014). Individual transferable quota contribution to environmental stewardship: A theory in need of validation. *Ecology and Society*, 19(2):35.

Vatn, A. (2001). Environmental resources, property regimes, and efficiency. *Environment and Planning C: Government and Policy*, 19(5):665–680.

Vatn, A. and Vedeld, P. (2012). Fit, interplay, and scale: A diagnosis. *Ecology and Society*, 17(4):12.

Vija (2010). Survey on Illegal Fishing in Lake Shkodra.

Villasante, S. and Österblom, H. (2015). The role of cooperation for improved stewardship of marine social-ecological systems in Latin America. *Ecology and Society*, 20(1):8–11.

Viteri, C. and Chávez, C. (2007). Legitimacy, local participation, and compliance in the Galápagos Marine Reserve. *Ocean and Coastal Management*, 50(3-4):253–274.

Vugdelic, M. (2010a). Current Management, Economic Development, Projects and Initiatives in the Skadar Lake Region. Report.

Vugdelic, M. (2010b). Natural Base, Policy and Legislative Framework – Socio Economic Situation in the Skadar Lake Region. Report.

Warner, K. and Havens, A. E. (1967). The Logic of Collective Action: A Review Essay. *Land Economics*, 43(4):446–450.

Welcomme, R. L. (2016). Fisheries Management. In Craig, J. F. (editor), *Freshwater Fisheries Ecology*, pages 469–482. John Wiley & Sons, Ltd.

Welcomme, R. L., Cowx, I. G., Coates, D., Béné, C., Funge-Smith, S., Halls, A., and Lorenzen, K. (2010). Inland capture fisheries. *Philosophical transactions of the Royal Society of London. Series B, Biological sciences*, 365(1554):2881–2896.

Wiber, M., Berkes, F., Charles, A., and Kearney, J. (2004). Participatory research supporting community-based fishery management. *Marine Policy*, 28:459–468.

World Bank (2008). Implementation Completion and Results Report (IDA-36070 JPN-26253). Report.

Yang, K. (2008). Cooperation without Trust? *Public Administration Review*, 68(6):1164–1166.

Appendix

A Social-ecological Systems Framework

Table A.1 – First- and second-tier variables of the SES framework (OSTROM, 2007a) with according definitions. Latest changes and extensions from MCGINNIS AND OSTROM (2014) are considered.

Variables	Definition	Reference
Related Ecosystems (ECO)		
ECO1 – Climate patterns	–	OSTROM (2007a)
ECO2 – Pollution patterns	–	OSTROM (2007a)
ECO3 – Flows into and out of focal SES	–	OSTROM (2007a)
Social, Ecologic, and Political Setting (S)		
S1 – Economic development	–	OSTROM (2007a)
S2 – Demographic trends	–	OSTROM (2007a)
S3 –Political stability	–	OSTROM (2007a)
S4 – Other governance systems	–	OSTROM (2007a)
S5 – Markets	–	OSTROM (2007a)
S6 – Media organizations	–	OSTROM (2007a)
S7 – Technology	–	BASURTO *et al.* (2013b)
Resource System (RS)		
RS1 – Sector	Characteristic(s) of a resource system that distinguishes it from other resource systems.	BASURTO *et al.* (2013b)
RS2 – Clarity of system boundaries	Biophysical characteristics that make it feasible for actors to determine where the resource system starts or ends.	BASURTO *et al.* (2013b)
RS3 – Size of resource system	Absolute or relative descriptions of the spatial extent of a resource system.	LESLIE *et al.* (2015a)
RS4 – Human-constructed facilities	The facilities put into place to provide, maintain or improve the stock of RU.	HINKEL *et al.* (2015), Appendix 1

Variables	Definition	Reference
RS5 – Productivity of system	Rate of generation of units of biomass determined by production-consumption rates per unit of time, surface, or volume.	BASURTO *et al.* (2013b)
RS6 – Equilibrium properties	Characterization of the type of attractor of a resource system along a range from one to multiple (chaotic) attractors.	BASURTO *et al.* (2013b)
RS7 – Predictability of system dynamics	Degree to which actors are able to forecast or identify patterns in environmentally driven variability on recruitment.	BASURTO *et al.* (2013b), LESLIE *et al.* (2015a)
RS8 – Storage characteristics	Degree to which the resource units can be held captive until harvested.	BASURTO *et al.* (2013b)
RS9 – Location	Spatial and temporal extent where resource units are found by actors.	BASURTO *et al.* (2013b)
Resource Unit (RU)		
RU1 – Resource Unit mobility	Slow or fast moving resource units; costs of observing and managing a system depend on mobility of resource unit.	OSTROM (2009)
RU2 – Growth or replacement rate	Absolute or relative descriptions of the spatial extent of a resource system.	BASURTO *et al.* (2013b)
RU3 – Interaction among resource units	Interactions among resource units during different life stages affecting the future structure of the population.	BASURTO *et al.* (2013b)
RU4 – Economic value	Value of resource units in relation to the portfolio of resources available to actors.	BASURTO *et al.* (2013b)
RU5 – Number of units	Number of resource units harvested or that could be potentially harvested.	BASURTO *et al.* (2013b)
RU6 – Distinctive characteristics	Markings and/or behavioral patterns that can be identified in resource units and affect actors' behavior toward them.	BASURTO *et al.* (2013b)
RU7 – Spatial and temporal distribution	Allocation patterns of resource units across a geographic area in a particular time period.	BASURTO *et al.* (2013b)
Governance System (GS)		
GS1 – Policy Area	Rule systems tailored for a particular area of knowledge, geography, or time.	BASURTO *et al.* (2013b)
GS2 – Geographic scale of governance system	Spatial area where the rule system has effect or jurisdiction.	BASURTO *et al.* (2013b)
GS3 – Population	Population of actors on which the rule system has effect or jurisdiction.	MCGINNIS AND OSTROM (2014), BASURTO *et al.* (2013b)

Variables	Definition	Reference
GS4 – Regime type/management strategy	Specifying the overall logic upon which the overarching governance system is organized.	McGinnis and Ostrom (2014)
GS5 – Rule-making Organizations	Types of institutions recognized by external actors and/or authorities that facilitate formal structured interactions among actors affected by these institutions.	McGinnis and Ostrom (2014)
GS6 – Rules-in-use	Human-constructed constraints or opportunities within which individual choices take place and which shape the consequences of their choices.	McGinnis (2011)
GS7 – Property rights system	Specifying the relations among people in relation to things, as well as duties and obligations.	McGinnis and Ostrom (2014)
GS8 – Repertoire of norms and strategies	Human behavior shaped by beliefs, perceptions, and the biophysical setting; it governs social interactions, but it is distinguished from rules in that there is no formal sanctioning in place.	Basurto *et al.* (2013b)
GS9 – Network structure	Connections among the rule-making organizations and the population subject to these rules.	McGinnis and Ostrom (2014)
GS10 – Historical continuity	Temporal aspect of systems of governance, which allows the distinction between static and adaptive/more flexible systems.	McGinnis and Ostrom (2014)
Actors (A)		
A1 – Number of relevant actors	Number and type of actors that are present within a particular social-ecological system and participate in or interfere with the harvest of the resource.	Leslie *et al.* (2015b)
A2 – Socioeconomic attributes	Characteristics of actors related to social and economic dimensions affecting fishing dynamics.	Basurto *et al.* (2013b)
A3 – History or past experience	Past interactions that affect current actor's behavior and fisheries dynamics.	Basurto *et al.* (2013b)
A4 – Location	Physical place where the actors are in relation to the resource itself and the market.	Basurto *et al.* (2013b)
A5 – Leadership/entrepreneurship	Actors who have skills useful to organize collective action and are followed by their peers.	Basurto *et al.* (2013b)
A6 – Norms (trust-reciprocity)/social capital	Social capital is an attribute of individuals and of their relationships that enhances their ability to solve collective-action problems and involves trust/trustworthiness, networks and formal/informal rules and institutions.	Ostrom (2007b)
A7 – Knowledge of SES/mental models	Subjective knowledge about aspects of the systems and outcomes related to perceptions of how the SES functions influenced through cultural and environmental factors and past experiences.	Biggs *et al.* (2011); Hunt *et al.* (2013)

Variables	Definition	Reference
A8 – Importance of resource (dependence)	Dependence of actors on resource for a their livelihoods or attached value to sustainability of resource.	OSTROM (2009)
A9 – Technologies available	Harvesting technology used by actors.	BASURTO *et al.* (2013b), EPSTEIN *et al.* (2013)
Interactions (I)	**Outcomes**	
I1 – Harvesting I2 – Information sharing I3 – Deliberation processes I4 – Conflicts I5 – Investment activities I6 – Lobbying activities I7 – Self-organization activities I8 – Networking activities I9 – Monitoring activities I10 – Evaluative activities	O1 – Social performance measures (e.g., efficiency, equity, accountability, sustainability) O2 – Ecological performance measures (e.g., overharvested, resilience, biodiversity, sustainability) O3 – Externalities to other SESs	

Table A.2 – Diagnostic procedure for the application of the SES framework at Lake Shkodra, following HINKEL *et al.* (2015).

Step	Question	Application to Lake Shkodra Case Study
1	What is the research question?	What social outcomes can be observed at the SES Lake Shkodra, and which variables are associated with these relating to social capital?
2	Which actors (A) obtain which benefits from the SES? Benefits are understood widely, including instrumental, moral, aesthetic values, current vs. future values, direct vs. indirect values, option values, etc.	Fishermen catch fish to generate income and food for own consumption; nature conservationists preserve biodiversity for its intrinsic value, generating instrumental value (satisfaction over conservation of species and habitats, aesthetics etc.), international importance of the ecosystem; international organizations get funds to work on the lake and implement protection/development projects; government implements EU regulations, improved legitimacy and support for (political) measures.
3	Which collective goods are involved in the generation of these benefits? Several goods may be involved in the generation of a single benefit and several of these may be collective.	Focus on biodiversity in general and fish in specific, preservation of biodiversity and habitat conservation in general.
4	Are any of the collective goods obtained subtractable? If so, an appropriation action situation arises where activities subtract from a stock of resource units (RU).	Fishes are subtracted through fishing activities of professional fishermen and anglers; stock of the resources = fish stocks (± unreliable data about stock size); appropriation action situation = fishing, resulting in subtraction of resource units from resource stock.
5	What are the biophysical and/or technological processes involved in the generation of the stock of RU? These will collectively be called the resource system (RS). Multiple RS may be relevant and several types of RU may be obtained from the same RS.	Biophysical processes are natural regeneration of fish stocks; stocking is not conducted any more; climatic and hydromorphological conditions are important, e.g. connection to lagoons and the sea is important for migratory fish species, water turnover rate and temperature influence species composition, spawning time, species distribution.

6	How do the variables of RS and RU characterize the appropriation-related governance challenges? Now that the concepts of RS and RU have been defined for the particular SES studied, the second-tier variables of RS and RU can be applied to further characterize the governance challenges at hand.	Uncertainty of RU stocks and of the predictability of the system dynamics. Governance challenges arise mainly due to the fact that Lake Shkodra hosts a number of commercial fish species which attract a high number of fishermen while at the same time the ecosystem provides a variety of (endemic) rare and endangered species and habitats that are in the focus of nature conservation. Among the targeted RU some migratory species are found that profit from the lake's communication with the sea. Dense vegetation at the eastern shore makes access controls difficult.
7	What kind of institutional arrangements have emerged as a response to the appropriation action situation governance challenge? This question forms the entry point to making A and governance system (GS) variables operational.	In order to restrict access a licensing scheme is applied, limiting the number of legally allowed fishermen at the lake to ensure sustained stocks. Furthermore, legal fishing methods are defined and monitoring and sanctioning mechanisms for non-compliance, as illegal activities have negative consequences for the whole ecosystem. Seasonal restrictions target the reproduction cycle of valuable fish species. The devolution of management responsibilities is regarded as valuable measure to increase sustainable management in line with EU regulations and foster collaboration among actors involved in fishery and nature conservation for joint pursuit of fulfilling the legally defined objectives.

B Methodological Supplement

B.1 Guideline for Interviews

Name:

Date/Time:

1. **General information**
   (a) Profession:
   (b) In how far are you concerned with fishery and nature protection at the lake?
2. **Nature protection and Lake Shkodra**
   (a) Has there been a change at the lake and the way it is used (e.g. through fishery) over the last years? Please explain.
   (b) In your opinion, what is currently the largest threat for Lake Shkodra? Which are the problems that need to be solved most urgently?
   (c) Do you think nature protection can prevent damage through the named threats or provide solutions for the problems?
      i. What benefits do you derive from nature conservation at the lake?
      ii. What costs/disadvantages do you derive?
   (d) In your opinion, what is necessary to protect the lake from previously named threats (future perspectives)?
   (e) Which, if any, problems do you see with nature protection and the lake and why do they exist?
   (f) Which, if any, problems do you see with fishery at the lake and why do they exist?
3. **Regulations on fishery and nature protection at the lake**
   (a) In how far does nature conservation contribute to the protection of water and biodiversity of fish at the lake?
   (b) Which rules are in place for fishery and nature protection? E.g. who is allowed to fish, how much, where, when, which species.
      i. How are those rules developed?

- ▷ Are there possibilities to participate in or influence the decision-making process? Which ones?
- ▷ Is participation in the management of the Lake possible? How?

ii. Which rules/regulations are most important for you and which ones do you think are unreasonable?

iii. How would you rate the effectiveness of these rules/regulations? Where do you see shortcomings of current legislation?

(c) Are there any social norms or other unwritten rules/traditions for fishery at the lake (moral standards etc.)? What kind of norms?

(d) Are there any forms of punishment, when non-compliance or violation of rules/norms is observed?

i. How is compliance/non-compliance monitored?

ii. Who is responsible for the punishment?

(e) Is there a monitoring of the performance of the fishery management in place?

4. **Actors at the Lake**

(a) Which actors are important at the lake?

(b) Are all groups/actors equally represented? Which groups/actors are most influential/active concerning fishery and/or nature conservation at the lake?

(c) Are you related to any other actors (fisher, conservationists, authorities, NGOs etc.)? Which ones and what kind of relation is it (friends, colleague, consultation)?

i. Bonding relationship

ii. Bridging relationship

iii. Vertical linking relationship

(d) Are there shared norms and perceptions among you and your colleagues? Is there a common understanding of fishery and nature protection at the lake?

(e) Is there common understanding and shared norms/values also with other actors at the lake, e.g. authorities, fisher, other organizations?

i. Who do you think has similar attitudes/perceptions/values/norms?

ii. Who has others or opposing ones? Why do you think this is so?

(f) How would you rate the trust among actors at the lake?

i. Do you regard other actors, e.g. fisher, organizations, authorities etc. as trustworthy? Please explain.

ii. Whom do you trust most/least? Why?

(g) With whom do you collaborate? Is there some sort of network concerning fishery and nature protection at the lake?

(h) How do you rate overall collaboration, if there is any?

i. Harmonic or displeasing?

ii. What are your incentives for collaboration?

iii. What are incentives for others to collaborate?

iv. How is the decision-making process organized? (hierarchical structures, participatory methods or equal contribution of all actors)

(i) Do you think it would be necessary to increase collaboration?

i. If so, under which circumstances and with whom? What potential benefits do you see?

ii. If not, please explain.

B.2 Qualitative Content Analysis Supplement

Table B.1 – Codes and definitions for the qualitative content analysis, in line with terminology of SES framework. Definitions in grey color indicate additional codes besides the SES terminology.

Category	Abbr.	1st level	2nd level	3rd level	Definition
Actor	A3	Past experience			Past interactions that affect current actor's behavior and fisheries dynamics (BASURTO *et al.*, 2013b) and the history of the governance system in terms of (in-)flexibility over time (MCGINNIS AND OSTROM, 2014).
	A8	Dependency on resource			Economic or cultural dependence, amount to which the resource plays a major role in fisher's ability to sustain their livelihoods (BASURTO *et al.*, 2013b).
	A7	Mental models			Mental models relate to subjective knowledge about aspects of the systems and outcomes related to perceptions of how the SES functions (BIGGS *et al*. 2011 in HUNT *et al*. 2013).
	INF		Information sharing		Mechanisms to share information about the state of the social-ecological system (SCHLÜTER *et al.*, 2012).
	SHA	Shared attitudes/norms			Shared attitudes and norms increase likeliness of successful resource management and contribute to the formation of a community (AGRAWAL AND GIBSON, 1999).
	A5	Influential/Key actors			Actors who have skills and power to facilitate or hamper collective action or collaboration, and are potentially followed by their peers (BASURTO *et al.*, 2013b; CÁRCAMO *et al.*, 2014).
	POS	Perception of own situation			Percpetion of the own situation in relation to other actors allows for the analysis of social group identity through shared attitudes and perceptions (BONAIUTO *et al.*, 2002).
	A2	Attributes of actor			Characteristics of actors related to social and economic dimensions affecting fishing dynamics (BASURTO *et al.*, 2013b).
	A6.2.1	Social capital	Networks	Bonding ties	Ties within cohesive subgroups (BODIN AND CRONA, 2009).

Category	Abbr.	1st level	2nd level	3rd level	Definition
	A6.2.2			Bridging ties	Ties that span between otherwise disconnected sets of actors (BODIN AND CRONA, 2009).
	A6.2.3			Linking ties	Particular kind of bridging ties, which vertically connect different hierarchical levels of authority (BODIN AND CRONA, 2009).
	A6.1		Trust		Trust is a measure of the extent to which members of a community feel confident that other members will live up to their agreements even if doing so may not be in their immediate interest (BASURTO *et al.*, 2013b).
	COR		Corruption		[...] the use or overuse of community (state, village, city, etc.) natural resources with the consent of a state agent by those not legally entitled. It is the extension of existing non-economic relationships (family, "friendship", and other socially obligating relations) to determine access to these use rights through normative systems of expected exchange (ROBBINS, 2000).
	PER		Perspectives		Options that actors identify in relation to resource appropriation, and would favor to satisfy their future needs.
Governance System	PAR	Participation			Levels of local actor's participation in SES related actions (PIMBERT AND PRETTY, 1995).
	GS1.2	Nature protection			Rule systems tailored to managing and governing human and biophysical interactions in order to preserve habitats and species (cf. BASURTO *et al.*, 2013b).
	GS7	Property rights system			Particular types of rules determining which actors have been authorized to carry out which actions with respect to a specified good or service (MCGINNIS, 2011).
	GS8	Norms/strategies			Human behavior shaped by beliefs, perceptions, and the biophysical setting; it governs social interactions, but it is distinguished from rules in that there is no formal sanctioning in place; also informal institutions as "voluntary 'regulations' that do not depend on enforcement and government control" (COOKE *et al.*, 2013, p. 442).

Category	Abbr.	1st level	2nd level	3rd level	Definition
	LEG	Legitimacy			Typically, a management system is expected to sustain fish stocks and at the same time respect the norms of equity, fairness, and trust that reside within user-communities. When a system is found to fulfill these qualities and thus obtains the status of legitimacy from the perspective of the users, a moral obligation to adhere to the rules rest on the user (JENTOFT, 2000b).
Rules-in-use	GS6.1	Operational rules			Implementation of practical decisions by individuals authorized (or allowed) to take these actions (MCGINNIS, 2011).
	GS6.1.1		Sanctioning		Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and context of the offense) by other appropriators, officials accountable to these appropriators, or both (COX *et al.*, 2010; BASURTO *et al.*, 2013b).
	GS6.1.2		Monitoring		Local actors or those legitimized by them are responsible to observe and report changes in the SES (BASURTO *et al.*, 2013b).
	GS6.1.2.1			Biophysical monitoring	Local actors, or outsiders legitimized by them, observe the condition of the resource system and units (BASURTO *et al.*, 2013b).
	GS6.1.2.2			Social monitoring	Local actors, or outsiders legitimized by them, observe that other actors comply with agreed-upon behavior in the use of the resource system and units (BASURTO *et al.*, 2013b).
	GS6.2	Collective-choice rules			The creation of institutions and policy decisions by those actors authorized to participate in the collective decision (MCGINNIS, 2011; LESLIE *et al.*, 2015a).
	GS6.3	Constitutional rules			The processes through which collective choice procedures are defined, including legitimizing and constituting all relevant collective entities involved in collective or operational choice processes (MCGINNIS, 2011).
	ADA	Adaptability			Institutions have the capacity to respond to changing environments and information (IMPERIAL AND YANDLE, 2005).
	ENF	Enforcement			Processes or mechanisms through which rules-in-use, e.g. laws and regulations on fishery, are implemented on the ground.

Category	Abbr.	1st level	2nd level	3rd level	Definition
Resource System	RS2	System boundaries			Biophysical characteristics that make it feasible for actors to determine where the resource system starts or ends (BASURTO *et al.*, 2013b).
	THR	Threats			Ecological and social aspects that actors perceive as detrimental for the ecosystem Lake Shkodra.
Resource Unit	RU	Resource units			Characteristics of the units extracted from a resource system, which can then be consumed or used as an input in production or exchanged for other goods or services (MCGINNIS, 2011).
Collective Action	ZOG	Zogaj			Unique features of the fishing community of Zogaj relate to the particular setting in which collective action at Lake Shkodra can happen.
Context	S	Social, economic, and political setting			The broader context within which the governance system *per se* is located, including the effects of market dynamics and cultural change (MCGINNIS, 2011).

Table B.2 – Coding guideline for the qualitative content analysis following MAYRING (2000).

Code	Example	Coding Rule/Indicator
A3	fisher_1: [...] früher konnte man einen Karpfen also 500 Gramm fangen und jetzt kann man nicht mehr, nur 200 und 300. Früher konntest du z.B. nicht alle Fische die du willst fangen. (18)	Reference to dictatorship, prior 1990 or use of indicator words: “damals”, “früher”.
A8	fisher_12: [...] ich habe nicht so viel Land. (4)	Stated income opportunities, availability of land/livestock.
A7	fisher_4: Er sagt, dass die Fischerei soll verboten, also die Behörden sollten das verbieten und dann kleinen Fisch reinwerfen, dann wird es wieder gut. (14)	Expression of subjective knowledge of how the SES Lake Shkodra functions.
INF	locNGO_1: Because if they [fisher] are missing information it is lack of management body. Or vice versa, if they are missing information as a management body, is weakness point for them. (38)	Information about options on learning and information sharing regarding RS, RU, GS and A.

Code	Example	Coding Rule/Indicator
SHA	sci_2: They [the fishermen] have only opinion based on their point of view. They don't judge or give any opinion based on [. . .] wider view. (91)	Knowledge about other actors with the same or opposing attitudes and moral understandings.
A5	fisher_16: [. . .] Die, die Haken haben glauben sie haben mehr Rechte als [wir], weil ihre Partei gewonnen hat. (190)	Expression of power/influence/responsibility either positive or negative.
POS	intOrg_3: It is not up to people like me. I am a simple man. [. . .] – I can do nothing. (38)	Statements which show clear evaluation of interviewees (socio-economic) situation compared to other actors.
A2	fisher_6: Also er hat das als Hobby schon als kleines Kind gehabt und 1991 hat er mit dem Fischen angefangen. (2)	Time spent working on the lake, differentiation of fishing gear, position etc.
A6.2.1	fisher_1: [. . .] Die Fischer, die hier fischen, [. . .] also seine Freunde, und die Fischer, die auf dieser Seite fischen, werden mit ihm diese Meinung teilen. Aber die anderen auf der Seite von Koplik nicht, weil sie sind nicht lizensiert und sie haben keine Ahnung von Fischerei. (88)	"We"/"They" understanding within one group of actors, mainly among fishermen.
A6.2.2	natGov_1: Furthermore, they decided to destroy all agreements established between the Ministry, Fishery Directorate authority and Fishery Organization. (31)	Connection between actors of different group, e.g. fishermen and inspectorate or FMO, or among different NGOs.
A6.2.3	fisher_7: Wir haben keine Beziehung mit denen [Welt Bank], wir wissen gar nichts von denen, weil alles, was sie herbringen, nehmen die Großen von der Organisation. (68)	Ties between different hierarchical levels, e.g. fishermen and ministry/governmental authorities or international organizations.
A6.1	fisher_5: Wir hatten Vertrauen, aber die Gelder sind nicht an den richtigen Platz gekommen. (81)	Reference to other actors or groups/organizations and their trustworthiness or the perceived interpersonal trust.
COR	fisher_6: Die Organisation kann man bestechen, aber den Staat nicht. (89)	Direct reference to corruption or bribery as extra-legal exchange or extraction (cf. Robbins 2000).
PER	FMO_2: Sobald wir das OK von dem Ministerium bekommen, bringen wir den ganzen Fisch in dieses Haus [FMO], und dann wird es besser gehen und werden wir natürlich alles aufschreiben. (46)	Expression of future expectations, options and hope, subjective as well as potential developments on a legal basis.

Code	Example	Coding Rule/Indicator
PAR	fisher_6: Als die Organisation mit dem Staat zusammenarbeiten musste oder etwas brauchte, haben sie erstmal die Fischer befragt oder getroffen aber nichts anderes. Nur, damit sie den Namen aufschreiben oder etwas unterschreiben, aber nichts anderes. (65)	Opportunities for participation and degree to which stakeholders are able to participate in the decision-making process.
GS1.2	natOrg_1: There is a reserve, a natural reserve protected. So they are fishermen and they didn't have the information that this area has a category of protection. In terms of nature. Which means that the status has some rules. In this case they didn't know even this. (97)	References towards the role of the protected area and respective regulations.
GS7	fisher_15: Wir bezahlen die Lizenz und aber nichts anderes, nicht, dass wir versichert werden oder irgendwas anderes. (10)	Licenses, monitoring/reporting and sanctioning responsibilities.
GS8	fisher_1: [...] wenn ich fischen gehe, lasse ich alle kleinen Fische raus, damit sie wachsen, und nehme nur die Großen. (18)	Rules established among actors besides the legal framework with linkage to fisheries.
LEG	fisher_2: [...] es gibt schon Regeln, aber niemand hält sich an Regeln, weil also die diese Behörden, anscheinend, zusammenarbeiten, aber trotzdem gibt es Fischer, die fischen. (28)	Expression of endorsement of the institutions or management system, the institutional acceptance.
GS6.1	fisher_4: Sie sagen, das ist die Vermehrungszeit, also zwei Monate, dann wir fischen nicht mehr, wenn sie sagen wir dürfen fischen, dann fischen wir. (60)	Rules-in-use that relate to everyday actions with regard to fishing.
GS6.1.1	FMO_1: Wenn z.B. ein Fischer erwischt wird und illegal Fischer fängt, wird seine Lizenz abgezogen für ein Jahr und wee es was sehr schlimmes ist, geht es auch bis drei Jahre. Es gibt auch kleiner Strafen. Strafzettel. (23)	Rules-in-use related to formal and informal sanctioning.
GS6.1.2	sci_3: There is only one inspector for the whole region. The others I don't know what, they don't have a real regulation how to cooperate together. We are just seeing fragmented institutions or fragmented work. (67)	Rules-in-use related to formal monitoring mechanisms.
GS6.1.2.1	fisher_8: [...] man registriert nicht, wie viele Fische wir fangen, wie viele rausgehen und wie viel Fisch es gibt eigentlich. (129)	Rules-in-use related to biophysical monitoring mechanisms.

Code	Example	Coding Rule/Indicator
GS6.1.2.2	fisher_10: Wir sehen die Generatoren, aber machen ein Auge zu und sagen gar nichts. (43)	Reference to social monitoring mechanisms, their relevance and enforcement.
GS6.2	fisher_3: Auch das Ministerium nimmt ihre Meinung und es ist irgendwie wie die bestimmen eine Regel und dann wird im Ministerium, es ist eine gegenseitige Beziehung [...]. (53)	Reference to the decision-making process and participating actors as well as their roles.
GS6.3	natGov_1: [...] Fishery Management Organization as a legal entity, but not profit organization, create as an actor with the support of World Bank [...]. (90)	Reference to the frame of the co-management system and the position of actors within the management arrangement.
ADA	fisher_2: [...] die Regeln verändern sich nicht, also sind immer so. (34)	Estimation of the possibility and pace to adapt institutions to a specific situation.
ENF	natNGO_2: There are some areas in the new regulations, that exist on papers, [...] but since the control is again low, it is not working. (40)	Actors' perceptions regarding the enforcement of the formal and informal rules-in-use at operational, collective-choice and constitutional level.
RS2	fisher_13: Wir können Fische fangen wo wir wollen. (50)	System boundaries are ecologically and socially defined.
THR	journalist: Now there is interview in local TV Shkodra with inspector, he say the crap, traditional fish, is in danger because of aluminum fabric in Montenegro. There are different things, but illegal fishing is very very problem here. (57)	Threats to RS and RU as seen by interviewees, link to knowledge of the system, perception of own situation (e.g. if they feel responsible for the threats or capable to change the situation).
RU	fisher_2: Aber er sagt es gibt auch Fische, die vom Meer kommen und lassen die Eier hier und dann gehen sie wieder weg. (18)	Information about fish resources.
ZOG	fisher_1: In Zogaj gibt es 100% lizensierte Fischer und dort gibt es 60 Häuser und sie organisieren das selbst. Fischen selbst und teilen das Geld. Es ist sehr gut organisiert. (90)	Reference to fishing community in Zogaj (needs to be treated as a separate case and therefore all aspects relating to this are identified).
S	natNGO_1: Social-economic situation of Albania is mostly to use as much as possible, there is not enough the concept of sustainable development, of sustainable use. (124)	Reference to wider Albanian context, e.g. accession to EU, cultural habits, etc.